



# Design for resilience at home: Integrating housing and regenerative food systems

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# Statements

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Signature:

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# Abstract

At the core of this design research is the profound question of how to nourish, shelter and foster the well-being of our burgeoning population on earth, in a regenerative and equitable manner. Contemporary housing and food systems in Australia, as in many developed settings, are largely modernist legacies reflecting a bygone era of cheap and plentiful resources, and persistent anthropocentric perspectives disconnecting humans from our ecological dependencies. Viewed from a resilience perspective, dominant housing types and food system institutions are deeply implicated in widening ‘ecological overshoot’ and biospheric disruption, as are associated practices of design.

In response, I propose how housing and food systems can be integrated as an urban resilience strategy through a merger of ecological design research and resilience inquiry. The re-visioning of the homescape central to the thesis builds upon recent developments in urban agriculture, emergent ‘productive housing’, alternative food movements, and broader sustainable living strategies.

The design research approach, interrelating resilience strategies, practice theories, questions of type and participatory design, was conducted over three overlapping phases. Phase 1 – research *into* design – involved a social-ecological analysis of dominant food culture and domestic design centred on the kitchen, thereby establishing critical context for Phases 2 and 3. Phase 2 – research *for* design – comprised my ethnographic participation in 12 Tasmanian food-producing households, representing a range of density and tenure types. In Phase 3 – research *through* design – householders engaged in participatory design workshops to speculate how the home could better support their food-producing practices. In this final phase, I also undertook design iterations in response to a design meta-brief synthesised from the Phase 2 and 3 participatory methods.

The resulting regenerative food axis design patterns address high-density, medium-density, inner urban, suburban and peri-urban housing, and are represented using schematic models and indicative spatial layouts. In these

design outcomes, the kitchen-garden interface is illuminated as the catalyst of regenerative energy, water and nutrient cycles, in addition to important social functions. I follow with discussion of material and immaterial design considerations, scaling out from the kitchen-garden system to community-based alternative food networks.

Home-based food production is further located within a resurgence of homecraft, the know-how and making skills of which I highlight as complementary threads in enhancing urban resilience. In order to activate ecological restoration in our vast suburban tracts, I explore roles for design practice embedded within 'living labs' and grassroots networks. The thesis concludes with a strategic framework for integrating housing and regenerative food systems aimed at Australian design practice and design education, and for re-contextualisation in other developed and developing settings.

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# Introduction

## 1.0 Overview

At the core of this design research is the profound question of how to nourish, shelter and foster the well-being of our burgeoning population on earth. After at least 10,000 years of human settlement, a capacity to fulfil our basic needs for food and shelter in a regenerative and equitable manner eludes us. In the current age of the Anthropocene, our quest for food, shelter, energy and other resources is now reconfiguring the earth itself. Incremental adaptation to our living environment, including that resulting from human design activity, has accelerated and altered irrevocably the very biophysical conditions in which we live (Folke, 2013). This evolutionary feat now positions us in conditions of critical 'ecological overshoot' (Catton, 1980; Wackernagel *et al.*, 2002), with the imbalance between our use of the finite biosphere and its replenishment widening at pace. Globally, the drivers and impacts of ecological degradation manifest in divergent ways among different societies, peoples and individuals, and the web of other species upon which our survival hinges. Design for resilience, directed in this thesis to housing and food systems at the scale of the home and community, is one strategy for responding to current and future human needs within an integrative, social-ecological systems framework.

The practice of design is implicated deeply within the exercise of human prowess underpinning ecological crisis, particularly through the unprecedented

trajectories of industrialisation and modernity of the recent past. In response, I merge ecological design research and resilience inquiry to propose how housing and food systems can be integrated and contribute to the regeneration of all that sustains us, at the scales of dwelling we are most able to affect. The context of the study is urban Australia, but with a goal of transferability to other developed and developing urban settings. I focus on the home and its encircling community, enabled by of a set of householder participants whose ecologically literate practices are explored through 'design research for resilience' and its participatory methods.

'Home' is understood simultaneously as our respective places of dwelling, and also embraces the entire 'phenomenal world' containing "our origins, our history, our milieu", to invoke Ian McHarg's pioneering perspective on human ecology and design (1992 [1969], p. 29). In a complementary perspective from agriculture, farmer and writer Wendell Berry (1987, 2009) implored us to look upon our homes, kitchens and eating places as starting points for our collective responsibility to care for the earth. My interest in the scale of the home and its everyday practices also arises from recognition of sheer magnitude. The ecological impacts of eating and ways of living across every street, suburb and city on earth are monumental, as Carolyn Steel underscored in *Hungry City* (2009).

This study is therefore located at the under-explored intersection of the fields of food system planning (Donovan, Larsen & McWhinnie, 2011; Nasr & Komisar, 2012; Viljoen & Wiskerke, 2012), design for urban agriculture and emergent productive housing (Gorgolewski, Komisar & Nasr, 2011; Philips, 2013), ecological housing design, and strategies for sustainable living. The study shares the future-shaping intentions of Ezio Manzini and François Jégou in *Sustainable Everyday: Scenarios of Urban Life* (2003), with more specific exploration of food systems and household practices, serving an explicit, post-sustainability resilience agenda. Food production at the intimate scale of homes, kitchens and gardens is a field most served to date by popular, practical and narrative accounts such as those devoted to 'urban homesteading'. By exploring spatial-material types at the scale of the home and their interplay with everyday practices as a site of scholarly inquiry, the study is positioned to



complement this valuable existing work, and to inform design practice and design education.

The study is conceived through a social-ecological systems perspective drawn from resilience thinking, the central tenet of which is a capacity to adapt to disturbances and shocks, whether of ecosystems, cities, organisations or individuals. 'Regenerative homescapes' are envisioned as collectivities of individual households whose resilience is enhanced through design, in interplay with ecologically literate household practices. The crucial linking of scales and systems expressed variously through the works cited above permeates my thinking and writing. The works also reveal a greater disconnection of humans from the origins of all life and matter in the biosphere. Ecological disconnection and re-connection therefore form key threads in the context of the study, posing dilemmas and opportunities for design research, foreshadowed in this introduction and expanded in Chapter 3.

In this chapter, I first frame the key problems relating to food systems and housing in Section 1.1, establishing the global ecological status and the relevance of post-sustainability perspectives. I state my three key research questions in Section 1.2, followed by an overview of the research design in Section 1.3. Concepts foundational to the inquiry – resilience and regeneration, the questioning of types, practice theories and participatory design – are outlined in Section 1.4. The chapter also includes a summary of the thesis structure in Section 1.5, and a brief reader's guide in Section 1.6.

## 1.1 Inquiry context and problem framing

The overarching context for the study, and the problems framed in relation to food systems and housing, link ecological overshoot with humanity's prolonged and vexed relationship with nature. 'Nature' in this sense is a cultural construct, as environment and agriculture scholar Jules Pretty (2002) highlighted, differentiated from the planetary biosphere which contemporary science seeks to comprehend and quantify. Accepting ecological disconnection as a root cause of human-wrought ecological degradation, I profile key metrics that elucidate and substantiate the status of ecosystems globally, noting the role of

the 'ecological footprint' (Wackernagel & Rees, 1996) as a re-connection strategy. I then narrow focus to sustainable development as it was conceived in the late 1980s, its persistence in definitions of sustainability, and the design-related responses to its demonstrated limitations. Social-ecological systems and post-sustainability design concepts are then introduced as conceptual keystones for the inquiry. This initial context and problem discussion is developed further through the literature review of Chapter 2 centred on food systems and housing, and the social-ecological analysis of the domestic sphere in Chapter 5.

## Human ecological disconnection

Discussions of human ecological disconnection such as those by McHarg (1992 [1969]) and Pretty (2002) imply that our sources of water, energy, nutrients, fuel and fibre have been largely forgotten or denied. Certainly to people who are readily fed and housed, the ecological and material origins of their food and shelter have become obscured by a complex and distancing layering of resource extraction, industrial processing, production, supply chains and markets now inter-operating, and competing, to meet those needs. This complexity is exemplified in Deborah Barndt's *Tangled Routes* (2002), in which she rigorously traced the production and supply chains of Mexican tomatoes through to consumption in North America, integral to the human costs of an industrialised and globalised food system. Pertinently, Barndt also observed how "no one person [within the chain] has the whole picture" (2002, p. 10).

In this disconnection resonates the theory of alienation proposed by Karl Marx (1977 [1844]) in the nineteenth century, in which he sought to redress man's [sic] 'intimate ties' with the earth, severed through his 'estranged labour' under capitalism. With Frederick Engels (1970 [1846]), Marx elaborated on the roles of objectified labour and world markets as compounding alienating powers undermining the humanity of the individual. With regard to contemporary markets and marketing there is ample evidence of the incitement and fabrication of human needs to increase production, trade and consumption, apparent in Raj Patel's incisive critiques of global markets (2007, 2010). In the outfall of global commerce, provenance has been re-cast. Food really does come from the supermarket, and a new project home comes from a brochure or

website, unless of course their supply chains are traced to their genuine origins in the biosphere.

Writing on culture and design, environment scholar David Orr termed the resultant project of the age for humanity as the 'Great Work', "transforming human activity on the earth from destruction to participation and human attitudes toward nature from a kind of autism to a competent reverence" (2002, p. 4). In the West, McHarg attributed the destructive force of humans in large degree to the moral legacy of monotheistic religions that condoned man's [*sic*] dominion and subjugation of the earth (1992 [1969], pp. 26-29). Over four decades later, and with numerous compounding factors including the post-Second World War ascent of reductionist science, McHarg's original analysis still resonates. Echoed in explorations and critiques of industrialised agriculture, modern food systems and food culture, disconnection is a self-perpetuating and de-sensitising force distancing humans from what sustains us (Barndt, 2002; Berry, 2009; Cribb, 2010; Montanari, 1996; Pollan, 2006, 2008, 2013; Singer & Mason, 2006; Steel, 2009).

## Metrics of ecological status

This human ecological disconnection forms part of the global context for the study, in which the *status quo* provision of food and housing increasingly come into question. In this section I draw on substantive indicators to establish the global ecological status. Over decades scientific entities have sought to quantify a host of environmental and demographic variables to inform policy, governance, resource management and future modelling. The contentious *Limits to Growth* for the Club of Rome (Meadows, Meadows, Randers & Behrens, 1972) reported a range of future scenarios devised by early computer modelling using the variables of world population, industrial production, pollution, food production and resource depletion. The notion of limits invokes the eighteenth century theories of Thomas Malthus (1970 [1798]) who argued that population growth would outstrip food production, checking growth as a result. Despite dismissal of *Limits to Growth* in various quarters including broader science, industry and politics, recent analysis of data collected between 1970-2000 by Australian scientist Graham Turner (2008) supported one

scenario proposed by Meadows *et al.* namely, systemic collapse, by the mid twenty-first century.

Turner's (2008) conclusion on the projections made within *Limits to Growth* was preceded by the extensive Millennium Ecosystem Assessment (MEA, 2005). Instigated by the United Nations, 24 ecosystem services essential to human well-being were examined by over 2000 authors and reviewers. Fifteen of those services were found to be "degraded or used unsustainably, including fresh water, capture fisheries, air and water purification, and the regulation of regional and local climate, natural hazards, and pests" (MEA, 2005, p. 1). The assessment also underscored the persistence of poverty and inequity of access to ecosystem services in many regions, with women and children particularly impacted. Universal food security by the year 2050 (the limit of the assessment's projection period) was not achievable in any of the four alternative human response scenarios presented (MEA, 2005, p. 17), against a projected global population increase from around 7.2 billion currently, to 9.6 billion by 2050 (United Nations, 2013).

Beyond the Millennium Ecosystem Assessment findings, there is a growing consensus among scientists on the potential for abrupt, non-linear and irreversible changes to the global environment (Cribb, 2010; Ewing *et al.*, 2010; Folke, 2013; Moberg & Hauge Simonsen, 2011; Rockström *et al.*, 2009; Turner, 2008; Walker & Salt, 2006). In response, the concept of 'planetary boundaries' was proposed in 2009 as comprising nine boundaries, which if not transgressed, may maintain a "safe operating space for humanity" (Rockström *et al.*, 2009, p. 1). In 2009, the authors estimated three boundaries had been transgressed already: climate change, rate of biodiversity loss, and changes to the global nitrogen nutrient flow cycle. The other six proposed boundaries comprise global freshwater use, change in land use, atmospheric aerosol loading, chemical pollution, ocean acidification, and stratospheric ozone depletion (phosphorus being paired with nitrogen in the nutrient flow boundary). The latest report of the Intergovernmental Panel on Climate Change (IPCC) (Field *et al.*, 2014), which focuses on climate related hazards, greatly escalates the risks to human security. In identifying current and likely regional impacts, it

makes transgression of the climate change boundary more comprehensible at smaller scales.

Charting connections between food systems and housing to planetary boundaries and potentially safe thresholds is contingent upon a host of scientific fields and their synthesised findings. The global, industrial food system, for example, is attributed with not only fossil fuel depletion but accelerated greenhouse gas emissions, freshwater and topsoil depletion, nutrient loading of waterways, and biodiversity loss, among other impacts (Cribb, 2010; Millstone & Lang, 2008; UNCTAD, 2013). Several of these impacts also result from the energy and resource intensive construction of housing, and its ongoing operation. These include accelerated greenhouse gas emissions, air and water pollution, urban heat island effects, and particularly topsoil and biodiversity loss, given that food production and housing now commonly compete for land proximal to expanding cities (Cribb, 2010; Goldie, Douglas & Furnass, 2005; Viljoen & Wiskerke, 2012).

A significant development in re-connecting people and their impacts to the biosphere has been the concept of the 'ecological footprint' developed by planning scholars William Rees and Mathis Wackernagel in the early 1990s. Since *Our Ecological Footprint: Reducing Human Impact on the Earth* (Wackernagel & Rees, 1996) was published, the notion of a 'footprint' has become common parlance. The term 'carbon footprint' is now used in popular discussion of climate change at a range of scales – nations, industries, businesses, households and individuals – and in relation to activities such as travel (Mitchell & Yeang, 2010) and new home design (McCloud, 2009). While carbon forms the primary component in most developed nations' ecological footprints (WWF, 2014), popular focus on the 'carbon footprint' obscures the full range of biospheric variables at play, and the complexity of the ecological footprint accounting that continues today and its role in policy and governance.

The ecological footprint's inception was predicated on the premise that ecological services need to be valued as 'natural capital' and therefore be subject to the accounting applied to other forms of capital. The Global Footprint Network has pioneered accounting methods to this end, with members Ewing et

*a/.* reinforcing that “[i]n an age of growing resource scarcity, the wealth of nations increasingly will be defined in terms of who has ecological assets, and who does not” (2010, p. 5). Currently, the global balance sheet sits in a serious overshoot position, with an inability to renew ecological resources relative to their use. In recently published rankings based on 2010 accounts (WWF, 2014), there persists great disparity in ecological footprints per capita between the 25 highest footprint countries, and the remaining 127 countries listed. In thirteenth place, Australia’s per capita ecological footprint overshoots the world average biocapacity available per person, over three times (WWF, 2014, pp. 12-13).

In summary, these metrics elucidate the causes and conditions of ecological overshoot more fully, and how it is experienced unequally throughout the world. Climate change and carbon emissions, which garner extensive popular attention, are revealed as only two of a wider set of potential planetary boundaries or thresholds. This global context positions the study and its focus topics of housing and food systems in anticipation of an increasingly unpredictable future in which *status quo* access to ecosystem services and material conditions is disrupted, acutely so in some regions. In Section 1.4, I define resilience thinking and adaptive capacity to take up this critical thread, but first set out the limitations of, and persistence of ‘sustainable development’ as an unambitious goal for humanity.

## Beyond sustainable development

The metrics of ecological status outlined above present a reality for ecological design and design research highly dissonant with the vision of sustainable development endorsed by the United Nations in the late 1980s, which was “development which meets the needs of the present without compromising the ability of future generations to meet their own needs” (WCED, 1990, p. 87). This oft-cited and persistent definition of sustainable development formalised in *Our Common Future* (WCED, 1990) (or the *Brundtland Report*) was intentionally weak in order to gain acceptance, according to ecological design luminary William McDonough (1992). Summarising the ensuing debate soon after, political and agricultural scientist Kenneth Dahlberg (1993) described a struggle between those who would redefine development altogether, including the political economy and trade relations, and the privileged who would defend their

*status quo*. Affluent Australia's performance, with its natural resource wealth and thirteenth highest ecological footprint (WWF, 2014), falls decidedly in the second camp.

In a 2010 review of progress of the strategic goals set out in *Our Common Future* (Drexhage & Murphy, 2010), weak national governance and the unbridled consumption of affluent western countries were identified as the primary culprits in the failure to meet targets. For over two decades, criticisms of the dominant sustainable development agenda have been filed from a host of fields. A critical flaw in the view of architectural scholar Janis Birkeland (2002, 2008) was that it was predicated on an acceptance of continued economic growth, and therefore some inevitable degree of environmental degradation and trade-offs to balance competing interests. In failing to challenge the dominant political ideology, this framing of sustainability has resulted in fertile conditions for 'green capitalism', which to environmental justice scholars Ian Cook and Erik Swyngedouw amounted to 'ecological modernisation' as a straightforward inheritance from modernity (2012, p. 1962). I revisit this theme in Section 1.4, and in relation to 'green' design and consumption in Chapter 5.

Across the design disciplines the legacy, flaws and limitations of the 1980s sustainable development agenda have on the whole exercised scholars and practitioners in critical and constructive ways. McDonough and Michael Braungart (2002, 2013) continue to argue that sustainability and 'eco-efficiency' equate most commonly to 'doing the same things less bad'. Aligning with their critique were Orr's (2002) indictments, levelled at the inertia of government and industry in the face of evidence, and the critique of the design profession itself by Tony Fry (2009, 2011), for replicating the unambitious practices of the *status quo*. Unambitious design practice manifests in much building described as 'sustainable' according to Birkeland, "which largely aims to reduce negative environmental, economic and social impacts", but only down from a level of greater negative impact (2008, p. 8). These critiques echo the 'competing logics' of sustainable architecture that Simon Guy and Graham Farmer identified in their earlier theoretical reinterpretation of ecological design (Guy & Farmer, 2001). They highlighted the diverse sources of environmental

knowledge and contrasting roles assigned to technology within multiple 'ecologies', including 'ecological modernisation'.

The expanding post-sustainability discourse to which the design disciplines are contributing is grounded in a greater comprehension of the interdependence of social and ecological systems, as I elaborate below. The Stockholm Resilience Centre gives prominence to social-ecological systems as its scope of scientific inquiry, giving even weight to the terms 'social' and 'ecological' to reflect their intractable connections (Moberg & Hauge Simonsen, 2011; Hauge Simonsen *et al.*, 2014). This reasoning intersects with McDonough and Braungart's rebuttal of the term 'nature's services' because it implies the natural environment exists only to serve humans. They advocate ecosystems and their processes be understood as "part of a dynamic interdependence" between all organisms and their environment (2002, p. 80). In food and agriculture, this is a precept traceable in Berry's early writing on diverse farms and communities (for example, 1987), Bill Mollison's (1990) permaculture principles, their development by co-originator David Holmgren (2002), and within Dahlberg's (1993) argument for the relevance of regeneration over 'sustainability', to convey the necessity for healthy continuity in all living systems.

### Post-sustainability design perspectives

With the rise to prominence of social-ecological systems thinking, the evolved ideas within post-sustainability design discourse can be characterised via four key observations. The first is a rejection of narrow natural resource management practices in favour of integral and scalar approaches. The new approaches seek to avert the utilisation of one ecosystem service at the expense of another (for example when the development of coastal wetlands for housing in turn undermines storm surge and flood protection). Second, the pursuit of targeted technical solutions such as renewable energy conversion and waste recycling are seen as only partial solutions if they fail to make any contribution to ecosystem reparation or improved health and amenity for people. Third, ecological design is contingent upon collaboration and expertise beyond the traditional organisation of the design professions, inclusive of scientific, social, cultural and traditional knowledge. Fourth, all development in which design plays a role is conceived as uncapped in its potential for positive



ecological outcomes, termed 'positive development' by Birkeland (2008). This uncapping in positive development marked a profound shift in the aspirations of design practice, compared with the pursuit of sustainable development.

Refining this concept as a regenerative 'upcycle', McDonough and Braungart (2013) challenge designers to devise multiple ecological, social and economic benefits as standard practice.

In *The Upcycle* (2013), McDonough and Braungart urge designers to identify opportunities and advocate within projects to rebuild biodiversity, improve air and water quality, generate surplus renewable energy, utilise daylight for human well-being and energy conservation, and leverage existing community resources and structures. A similar pursuit of opportunity is expressed in the 'ecological urbanism' propounded by architectural scholar Mohsen Mostafavi (2010). The retrofitting of existing cities' infrastructure is approached for multiple, enhanced uses and maximal ecological benefits, also contingent upon the linking of urban and regional scales. Many of these ideas are formalised by eminent architect Ken Yeang in his design strategies for strands of synergistic 'ecoinfrastructure', seamless and benign biointegration, ecomimesis (designing in imitation of functioning ecosystems), design for ecosystem reparation, and the design of self-monitoring systems to enable more immediate responses to ecological degradation (2011, pp. 258-263).

## Rationale for the inquiry

The *status quo* with which I grapple in this study is a manifestation of the major trajectories of Western philosophy, critiqued as 'skewed' over two decades ago by philosophers Deane Curtin and Lisa Heldke:

Our tradition has tended to privilege questions about the rational, the unchanging and eternal, and the abstract and mental; and to denigrate questions about embodied, concrete, practical experience (1992, p. xiv).

In short, rationalism, scientific reductionism and technological primacy have demonstrated their bias and limitations, and there is now wider acceptance that the social-ecological systems on which we depend are being degraded. Design

research and resilience thinking present a means to challenge, and offer alternatives to, the *status quo* by engaging in what Heldke (1992) termed ‘thoughtful practice’; privileging instead the complex, temporal, embodied and practical in the practice of ecological design.

Post-sustainability design perspectives offer critical conceptual tools to the study, and opportunities to pursue uncapped social and ecological benefits through design research, including greater equity in access to food and housing. Ecological housing design is making headway, as are alternative food systems and networks. Design educators, too, are recognising the ecological synergies in integrating food, urban and built spaces as the account of June Komisar, Joe Nasr and Mark Gorgolewski (2009) from Ryerson University attests.



Figure 1.1 Docklands Community Garden in Melbourne

The present however, is symbolised perhaps by Figure 1.1. In an urban renewal zone of inner Melbourne, the Docklands Community Garden is overshadowed by the monolithic facades of commercial development. Resulting from prolonged community activism and government support, the space is a

concession to the dominant urban form and its over-scale typologies. The tiny garden appears 'grafted on' and makes a plaintive call for the necessity of food and the amenity it can bring to the city. The adjacent building types, including high- and medium-density housing, make no concession to the garden. Their kitchens, balconies and limited green spaces belong to a culture of commodification and the industrial food system. This legacy of ecologically disconnected housing and productive space at the scale of the home is the essential, interdisciplinary problem ground for inquiry. The subsequent form and logic of the study arise from its three key research questions, set out in the following section.

## 1.2 Research questions

Having linked human activity to endemic ecological degradation and the unpredictable nature of future living conditions, the study is framed through social-ecological systems thinking. Merged with post-sustainability design perspectives and their application to food systems and housing, the following three research questions direct the inquiry:

1. What are the significant connections between food and housing, relative to changing social and ecological conditions over time?
2. How do the practices of ecologically literate, home-based food production fit with dominant housing typologies, and particularly their kitchens and gardens?
3. How can design research propose alternative, regenerative kitchen-garden systems as an urban resilience strategy?

These questions reflect a progression from seeking to understand present conditions and their genesis, towards a speculative focus on alternative future conditions. In the following section, I outline the methodological means through which I address these questions.

### 1.3 Research design overview

The inherent interdisciplinary nature of this study, which bridges ecology, food systems, housing and ecological design, was established in Section 1.1. Design research is appropriate for such interdisciplinary inquiry, with the design researcher able to explore multiple knowledge domains, integrate emergent theories and insights, and generate informed, future alternatives. The diversity now evident within the theories and practice of design research (which has evolved since the 1960s) is reflective of the various design disciplines from which it has emerged, including engineering, industrial design, information systems and architecture. Design research has come to be characterised by the three distinctions design theorist Christopher Frayling proposed in the early 1990s as research *into*, *through* and *for* art and design (1993, p. 5). These distinctions have been explored and developed subsequently with greater application to the design disciplines (for example, Cross, 2006; Downton, 2003; Grillner, 2013; Murray, 2013; Simonsen, Bærenholdt, Büscher, & Scheuer, 2010).

This study employs all three perspectives, with a progressive emphasis from research *into* design, to research *for* design and research *through* design in its practice-centred methodology. Drawing on the theories of John Dewey, Donald Schön, Pierre Bourdieu and interpretations of Bourdieu's work, among others, the inquiry is founded on the premise that practices represent sites in which multiple knowledge forms are embedded. Informed by such embedded knowledge, the practice of design can generate new knowledge in the forms of design representations, artefacts and discourse that offer alternative visions of the future, applied to social-ecological systems. As my second research question suggests, the practices with which I am most concerned are those of householders who are growing and producing food at home, integral to ecologically literate ways of living. Together, the questions direct an investigation between home-based food-producing practices, scaling out to their ecological, social and cultural significance, and their fit with the spatial and material dwelling environments in which they are enacted.

The methodology is expressed through an overlapping, three-phase research design corresponding to the three research questions in Section 1.2. I outline the purpose and rationale of each of the three phases below. My approach to design research and knowledge-making is elaborated in Chapter 3, emphasising distributed sites of design knowledge and multi-modal ways of knowing. Moving from the general to the specific in Chapter 4, I articulate how I enacted design research for resilience in this study by interrelating resilience inquiry, practice theories, questions of type and participatory design. This articulation of the research design forms a partial response to the third research question, which asks how design research can propose urban resilience strategies, through design. The focus equally reflects my aim to progress design research for resilience integral to this study, and support its transferability beyond the thesis.

### **Phase 1: Social-ecological analysis of dominant food culture and domestic design (research *into* design)**

The purpose of Phase 1 is to explore critically the dominant norms in Eurocentric food culture and related domestic design, and analyse these against accepted, relevant ecological principles. The rationale for this phase rests upon the sensory accessibility of culture and my assertion that knowledge, values and agendas are encoded within objects and environments. Through subjecting selected examples of visual and material culture (representative of dominant norms) to social-ecological interpretive readings, I elucidate the wider social and cultural context for conducting research *for*, and *through* design. The Phase 1 social-ecological analysis comprises Chapter 5.

### **Phase 2: Multi-household ethnography (research *for* design)**

The purpose of Phase 2 is to observe the interface between food-related domestic space and gardens, and to co-engage with participants in practices associated with home-based food production. My interest here extends to adaptations made to the domestic environment in order to enable targeted, ecologically literate practices, along with the values and meanings assigned to them by householders. The basis of this phase of inquiry is that the majority of housing stock in Australia was built after the Second World War during the rise of the industrial food system, in an era of cheap and plentiful energy. The fit of

dominant housing typologies with food producing practices, waste cycling and renewable energy systems, among other ecologically literate practices, is therefore questioned. My accounts of the multi-household ethnography and its analysis are presented in Chapter 6.

### **Phase 3: Participatory design workshops and design iterations (*research through design*)**

The purpose of Phase 3 is to generate design responses by participants in the study to the third research question: how can social-ecological design research propose alternative, regenerative kitchen-garden systems as an urban resilience strategy? Integrating and extending the insights of participants, I also engage in design iterations in this final phase in response to the same research question. The participatory methods in this phase seek to elicit participants' ecological literacy and firsthand experience of the practices associated with food growing and producing. My rationale derives from practice theories (refer Section 1.4) that recognise the experiential, tacit and embodied knowledge embedded in 'everyday design'. This can be engaged and given expression, I contend, through group dialogue and generative design processes. Participants' design speculations are included in Chapter 6, with my resulting design iterations forming Chapter 7.

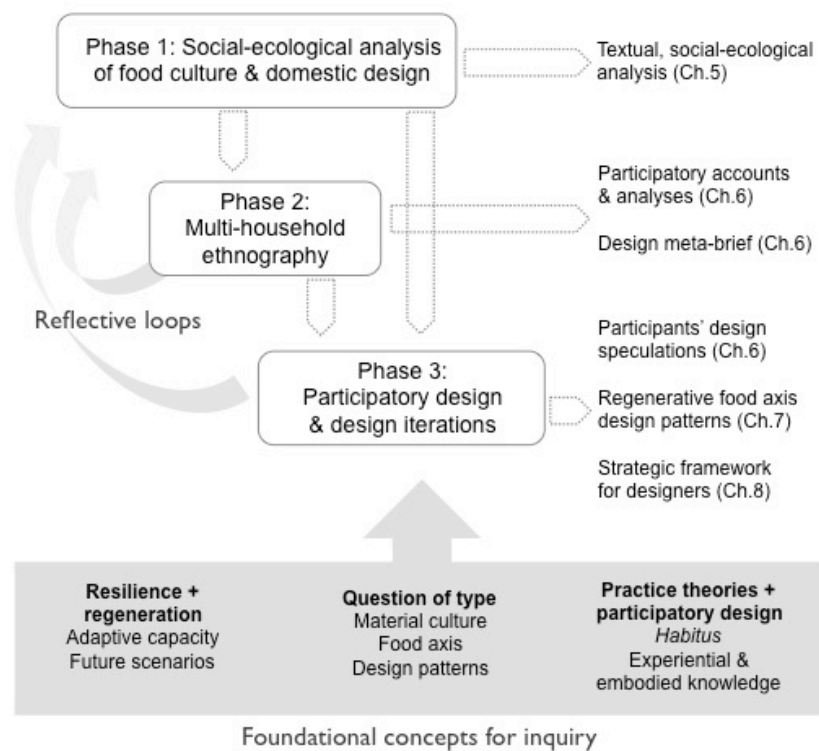


Figure 1.2: The three overlapping research phases and foundational concepts for inquiry

The three overlapping research phases outlined in Section 1.3 are summarised graphically in Figure 1.2, together with their outcomes. Also indicated are the connecting, reflective loops between phases, and the foundational concepts for inquiry to follow in Section 1.4.

## 1.4 Foundational concepts for inquiry

In this section, I define three sets of related concepts with the aim of qualifying their meaning within the thesis, and illuminating their significance in the inquiry. First, I return to the concept of sustainability and the related concepts that have eclipsed it in relevance. The issue of housing typologies relative to social-ecological conditions is outlined, followed by practice theories and their compatibility with participatory design. The interrelated nature of these concepts emerges in this section, signalling their synergies for the research design in Chapter 4. The terms are invoked both directly and indirectly throughout

subsequent chapters, such that they serve as fundamentals and linked, conceptual threads.

## Resilience and regeneration

The notions of ‘sustainable development’ and ‘sustainability’ (as they were conceived in the 1980s) have been superseded by post-sustainability concepts, signalled in Section 1.1. I distinguish here between problematic, contemporary uses of ‘sustainable’ and its derivatives, and the important concepts of resilience and regeneration, along with their application to design.

‘Sustainability’ has been subsumed in an age of ‘sustainababble’ according to Robert Engelman, Director of the Worldwatch Institute:

Through increasingly vernacular use ... the word *sustainable* became a synonym for the equally vague and unquantifiable adjective *green*, suggesting some undefined environmental value, as in *green growth* or *green jobs* (2013, p. 3).

Through associating the term ‘sustainability’ most commonly with ‘corporate greenwashing’, or the disingenuous marketing that makes appeals to consumers’ environmental concerns, Engelman (2013) also captures the vacuity of the majority of ‘green’ and ‘eco’ labelling. My subsequent, sparing use of these three labels proceeds mindful of such rhetorical meanings. In respect to design, Nancy Rottle and Ken Yocom concede that in sustainable design “contemporary conditions are typically conserved rather than improved upon” (2010, p. 78). The usage of ‘sustainable design’ may be intended to convey a genuine effort to balance environmental, economic and social values in what is perhaps an enduring legacy of *Our Common Future*’s ‘three pillars’ (WCED, 1990). Viewed from ecological fields (for example, Biggs *et al.*, 2012; Folke *et al.*, 2002; Moberg & Hauge Simonsen, 2011; Walker & Salt, 2006), sustainability, understood as a targeted and relatively stable state, has several pre-conditions, as is evident below in relation to resilience and regeneration.

In analysing and discussing the outcomes of the multi-household ethnography and design workshops in Phases 2 and 3 of the research design, I maintain a



use of the phrase ‘sustainable living’ due to its meaningfulness to participants. Their nuanced understandings of ‘sustainable’ were probed within the Phase 3 design activities, and are reported in Chapter 6. I also uphold popular usage when referring to movements and entities that identify themselves via this nomenclature, for example, ‘sustainable housing’ and ‘sustainable food’.

## Resilience thinking

Broadly speaking, resilience is “the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about the capacity to use shocks and disturbances ... to spur renewal” (Moberg & Hauge Simonsen, 2011, p. 3). Resilience thinking, therefore, accepts and anticipates ecological and social discontinuities beyond human control, as I have accepted explicitly as part of the global context for this study. The central tenet of resilience, as understood within the design fields, is that of increasing the ‘adaptive capacity’ of social-ecological systems, and as Rottle and Yocom (2010) note, recognition of hierarchies of scale and the processes and flows between them. The concept of redundancy, or ensuring multiple means of maintaining ecological conditions should one be disrupted, is intractable too from designing for enhanced adaptive capacity (Rottle & Yocom, 2010).

In summary, the key resilience strategies I have incorporated into my conception of design research for resilience include ongoing interdisciplinary inquiry spanning spatial and temporal scales; the inclusion of diverse stakeholders in developing adaptive capacity, especially at the most localised scales; and future scenario planning for the purpose of integrating substantive knowledge in collaboration with that of diverse stakeholders (Walker & Salt, 2006; Hauge Simonsen *et al.*, 2014). This point intersects fruitfully with practice theories and participatory design, introduced later in this section.

## Regeneration

The concept of regeneration and its derivatives serve as the inverse of the degeneration resulting from human activity on the earth. Within it are nested several sub-concepts that correspond to the ecological design tenets of designing for, with and like ecosystems, as Birkeland (2008) and Yeang (2011)

identified. In a sense, all human-initiated regeneration efforts can be seen as tasks contingent upon design, a precept central to the example of permaculture design. In its aspirations, regeneration eclipses sustainability as the typically unambitious benchmark. A regenerative perspective aims at “catalysing natural and human processes to improve environmental conditions over time, and to spiral resource production and ecosystem integrity upward rather than downward” (Rottle & Yocom, 2010, p. 78). Rottle and Yocom identify too the crucial role of closed loop, or self-replenishing, systems in regenerative ecosystem processes. This is highly relevant to the design of food systems in which synergistic energy, water and nutrient cycles and favourable climatic factors can result in yields beyond what the system requires for its own replenishment and renewal, as occurs in ecosystems. My orientation to regenerative food systems and housing is therefore contingent upon these cumulative concepts – the adaptive capacity of social-ecological systems, ecosystem restoration and uncapped regenerative cycles as the tripartite elements and goals of ecological design.

### The question of type

The ‘types’ to which I refer in this section are those spatial, material and conceptual categorisations manifested within the inquiry’s topics – food systems, food spaces, agricultural land, cities, suburbs, housing and houses, kitchens and gardens. Schön’s view of types, when writing on design process, were “particulars that function in a general way, or as general categories that have the ‘fullness’ of particulars” (1988, p. 183). I borrow ‘the question of type’ from architectural scholar Julia Robinson (1994) who urged building and spatial types to be considered as a starting point for design exploration, rather than an end point or solution. In setting out to inquire how to integrate housing and regenerative food systems as an urban resilience strategy, I am posing implicit questions of type. Overtly, I question how shelter and sustenance are to be achieved, spatially, materially and relationally, along with critical questioning of the existing, dominant housing and food-related typologies that are implicated in global ecological overshoot.

Typologies arise from conscious analysis of types, with productive housing and urban agriculture already presenting emergent typologies. New types of

housing and urban form are a response to questioning what housing and urban space are for, and where food is to be sourced for rapidly growing urban populations. The majority of our housing types are a modernist legacy reflecting an era of cheap and plentiful energy, as I highlighted in Section 1.3. In Australia, as in the United States, housing typologies were shaped by expanding suburban form, new transport infrastructure, car dependency, and idealised visions of nuclear family life, as Lynda Schneekloth and Karen Franck (1994) identified in their discussion of types. In the case of contemporary housing and food space types, such as energy-intensive, detached suburban houses and supermarket complexes, the types have become the 'normative patterns' Robinson (1994, pp. 179-180) described, in which systemic processes and knowledge are privileged and replicated. These persistent types accord with Schneekloth and Franck's argument:

The knowledge that is embedded in place types and typing becomes frozen and the places and social practices become difficult to unmake and remake. Types then become highly restrictive to change or transformation, indeed a prison that does not invite, or even permit, alternatives (1994, p. 33).

This resistance to transformation becomes apparent when dominant housing forms are scrutinised against the ecological design goals I set out in Section 1.1. New mainstream housing is not required to fulfil ecologically restorative or regenerative functions in addition to providing shelter, nor do its progenitors seek opportunities to provide net ecological benefits such as contributing to biodiversity, wildlife habitat or the food supply. While resilience is becoming a concern for urban authorities, there is little recognition through policy or regulation in Australia that dominant suburban form and types are currently undermining the overall resilience of social-ecological systems.

The questioning of types, at a range of scales, is therefore crucial to the inquiry and its alignment with ecological design and resilience agendas. Two concepts central to my questioning of housing types are the food axis of Elizabeth Collins Cromley (2010), and the design pattern language proposed by Christopher

Alexander, Sara Ishikawa and Murray Silverstein (1977) in the fields of architecture and building. The first – the food axis – enables historical and spatial mapping of domestic food spaces, functioning as a conceptual tool to relate the dynamics of food provisioning, storing, cooking and eating. The complementary pattern language comprises design elements that together enable inter-scalar consideration of domestic space and gardens, relative to social context. The two concepts are subsequently merged as a design heuristic to propose alternative types, guided by the alternative food-producing practices of the ecologically literate householders in the study, as I expand upon below.

## Practice theories and participatory design

Expressed through the overview of the research design in Section 1.2 and my discussion of types and typologies, is the dynamic between ecosystems, spatial-material environments; how people relate to and interact with them; and what they routinely do as a result. The latter component – relational and routine action – captures the nature of practices. At the scale of households, provisioning, cooking, eating, cleaning, consuming, recreating, and dealing with waste are all common practices. Sociologist Andreas Reckwitz, defined a practice as:

[A] routinized way in which bodies move, objects are handled, subjects are treated, things are described and the world is understood. To say that practices are ‘social practices’ ... is indeed a tautology. A practice is social, as it is a ‘type’ of behaving and understanding that appears at different locales and at different points of time and is carried out by different body/minds (2002, p. 250).

In his synthesis of a range of what have come to be considered practice theories, Reckwitz (2002) underscored the lack of a unified body of theory. Philosopher Theodore Schatzki (2001) traced the emergence of theories during the late twentieth century to Ludwig Wittgenstein’s practice thinking, and to contributions from sociology, cultural theory, and science and technology studies in recent times. It is through the application of practice theories to

sociology, anthropology, design and the creative arts for example, that the utility of a practice focus becomes apparent for inquiring into, and interpreting, social action. I give a fuller account of the genesis of practice theories and their interpretation within this study in Chapters 3 and 4. In the field of consumption studies, Alan Warde regarded practices as consisting of understandings, procedures and engagements which come into play through performances (2005, p. 134). Within those performances, which are often everyday and routine in nature, there has been considerable recognition of embedded knowledge, know-how and skill. This is demonstrated through Schön's (1983, 1988) inquiries into professional practice including design, and sociologist Richard Sennett's (2008) observations on the 'craft' of everyday acts such as cooking and parenting.

Through a social-ecological systems lens, everyday practices become highly significant, both for their potential cumulative impact, and their persistence and proneness to replication, as Warde (2005) noted. Clearly, consuming substantial material goods and generating landfill waste, using fossil fuel energy sources for transport, heating and cooling, using limited fresh water supplies, and purchasing and eating processed foods from industrial-scale agriculture become problematic practices. I connect these habitual practices with the objective structuring of our dispositions that Pierre Bourdieu (1977) explained as *habitus*. In his interpretation of Bourdieu, design theorist Tony Fry (2009) connected *habitus* with the prefiguring role of design. Design and practices have a special relationship in this regard given that design can initiate and privilege certain practices over others, signalled above in relation to housing typologies.

Advocating the compatibility of practice theories with design, theorist Guy Julier defined a structured framework for appreciating "the relationships between material goods and immaterial processes" (2007, p. 49). Design *produces* social and cultural activity, as Julier (2008) subsequently underscored. This bestows profound responsibility upon designers, conferring potential power that is exercised through the intentionality of design, as I elaborate in Chapter 3.

## Participatory design

Participatory design, as it was conceived in Scandinavia in the 1970s with origins in the workplace, responded to the power relations of design by proposing more democratic approaches to the design of work, its systems and technologies. The field has since expanded largely in tandem with the proliferation of information and communication technologies (Simonsen & Robertson, 2013). Socially-grounded theories and approaches are also proposed that cross over with design activism (for example, Fuad-Luke, 2009; Julier, 2011). Within participatory design, current and potential users of the outcomes of design are credited with possessing knowledge and know-how that professional designers do not, signalling co-designing and co-creation processes. Such knowledge is seen as essential for achieving effective, responsive and empowering designs, whether of systems, services, interfaces or buildings.

Participatory design is introduced as “a form of design practice embedded in specific contexts and working with particular constituencies to envision viable and desirable alternatives to the status quo” (Brown, Buchanan, Doordan & Margolin, 2012, p. 2). In the context of food, housing and households, I recognise that so much human activity is enacted in the everyday, beyond, but inseparable from formally sanctioned knowledge. Understanding everyday practices is key, therefore, to the processes of exploring and envisioning alternatives with participants, foregrounding the complementarity of practice-centred design research and participatory design. Participatory design is also highly compatible with resilience-building strategies contingent upon diverse stakeholder perspectives, future scenario planning and devising adaptive solutions.

In this study, the particular constituents with whom I collaborate are householders who have already adopted home-based food-producing practices, integral to broader sustainable living approaches. Participatory design is augmented with supporting participatory methods, as outlined in Phases 2 and 3 of the research design in Section 1.3, which enable me to not only observe and probe practices through dialogue, but to co-engage in the practices of householders. Householders are invited to engage as co-designers in

recognition of the tacit and embodied knowledge and know-how embedded in their ecologically literate practices.

Through distilling these three sets of foundational concepts for inquiry – resilience and regeneration, the questioning of type and typologies, and practice theories and participatory design, their synergistic properties become apparent. Applied to social-ecological systems, and food systems and housing therein, they represent a triad of positively interacting theoretical and practice-oriented positions that I develop further throughout the thesis. Paraphrasing the three, key research questions in Section 1.2, these concepts support critical questioning of the *status quo*, exploration of the fit between dominant housing types and ecologically literate practices, and the co-generation of future alternatives to enhance urban resilience. In the following section, I summarise the structure of the thesis and the role of each of its chapters.

## 1.5 Thesis structure

The thesis is structured as a broad expression of the three-phase research design – conducted as research *into*, *for* and *through* design – cohering the interdisciplinary threads of the study and its forms of inquiry.

The literature review of Chapter 2 establishes further the theoretical context of the study by connecting the current global ecological status with contemporary food and housing systems, and identifying problematic parallels in the two systems. Market imperatives and inequity are shown to characterise both systems, with countering alternative food and sustainable housing movements explored in response. Texts devoted to interplays between food and space are also explored, including built exemplars of integrated food space, productive housing and suburban adaptive re-use. Two key contextual domains emerge from the review. The first takes in urban form, housing supply and tenure patterns, while the second focuses on existing, suburban housing tracts as an immense, latent opportunity for ecological design.

In Chapter 3, I establish the hybridity of design knowledge and articulate my interpretive, generative approach to design research. I align the study with a

resilience agenda through discussion of intentionality in design practice, highlighting interdisciplinary knowledge-making with diverse stakeholders, and co-generation of future alternatives. I further define 'design research for resilience' and identify related ways of knowing that derive from analytic, participatory and practice-based inquiry. I also account for my own role in the study with reference to reflexivity, ethics and representation.

Chapter 4 is an account of conducting design research for resilience in this study. The overlapping, three-phase research design reflects the interrelation of resilience inquiry, practice theories, questions of type, and participatory design. The chapter forms a partial response to the third research question by demonstrating *how* design research can propose urban resilience strategies. Each of the three phases, as set out in Figure 1.2, is detailed in terms of its rationale, theoretical basis, forms of data, analytic approach and outcomes.

Chapters 5 to 8 of the thesis comprise the outcomes of my conduct of design research for resilience. The Phase 1 social-ecological analysis of dominant food culture and domestic design (research *into* design) forms Chapter 5. A sample of artefacts representing the *status quo* is analysed through a framework of ecological design and ecological food principles, providing critical context. Structured as four readings centred upon the kitchen, the analysis spans food lives and cooking, kitchens and consumption, kitchens of the past, and a critique of 'greening' in relation to contemporary homes and kitchens. The analysis also extends key housing and food system themes discussed in Chapter 2.

Chapter 6 is devoted to the outcomes of the participatory methods undertaken during Phases 2 (research *for* design) and 3 (research *through* design). Profiles and analysis of the 12 settings visited during the multi-household ethnography are first presented, ranging from the rural through suburban, medium-density and high-density for inter-scalar exploration. Issues of tenure, regenerative capacity relative to scale, and the social significance of food gardens are discussed. Participants' speculative design proposals resulting from the Phase 3 design workshop form the second half of the chapter. These image-based proposals are discussed in relation to the community and dwelling, broader



sustainable living strategies, housing norms, and roles for dematerialised design. I conclude the chapter by integrating participants' responses into a design meta-brief that guides my subsequent design iterations.

In Chapter 7, I build upon these participatory design outcomes by proposing 'regenerative food axis design patterns' as a means of spatialising and facilitating home- and community-based food production. I first locate these practices within a wider resurgence of homecraft, connecting making and re-use practices with resilience and spatial-material aspects of the home. I next identify and map regenerative food axis components using my own home as a 'living lab', and explore kitchen-garden interface configurations. Schematic design patterns and indicative spatial layouts are then presented for high-density, medium-density, urban, suburban and peri-urban scales, in dialogue with corresponding sets of potential food practices. Integrating the outcomes of Chapter 6, I also explore how the adaptive re-use of the suburbs might be activated with an emphasis on grassroots movements and roles for designers.

Chapter 8 concludes the thesis with a recapitulation of the key outcomes and arguments responding to the original research questions, and my reflections on the methodology, affirming the synergies between design research, resilience inquiry and participatory design. A strategic framework is also distilled for integrating housing and regenerative food systems, aimed at design practitioners and for initial transfer of new knowledge.

## 1.6 Reader's guide

Acknowledging the many scholarly traditions feeding into design research and their respective referencing and citation conventions, I have adopted an in-text convention. I consider the immediate presence of other voices in the text as compatible with the way I undertake writing as an iterative process integral to research, and distinct from writing as merely reporting. While respecting the rules of my chosen convention, I perceive some margin within it for conveying nuance, and therefore greater meaning. Integral to a suite of reflexive writing strategies outlined in Section 3.5 (intended to mediate the impact of my background, experience and disposition upon the study) are two strategies I

make explicit at this point in the thesis. First, I have acknowledged a hierarchy of influence throughout, whereby those authors who have most influenced my own ideas and arguments are introduced, named and discussed within the prose. Those consulted to a lesser extent, to provide an example or definition, I have cited only in parentheses. To maintain brevity in introducing new topics, I first list multiple sources in parentheses, prior to focusing on the specific works and ideas. This is demonstrated through the literature review to follow in Chapter 2, and in subsequent chapters.

Second, I have used verb tense to signal chronology. In citing a work published five years ago, for example, I represent the author in past tense rather than by the common use of present tense. Apart from extending the author's authority over time, this tradition fails to accommodate the possibility that his or her position may have changed, or to recognise the time lag built into academic publishing. I have adopted present tense only for the most recent works. My commitment to these strategies has fostered an active and constructive engagement with the ideas and arguments of others, along with a criticality of my own iterative representations.

## 1.7 Conclusion

In this introductory chapter, I have connected housing and food systems in developed settings to the gravity of our global ecological status, to argue for alternative, regenerative ways of providing food and shelter. Through consideration of post-sustainability and ecological design perspectives, I have aligned the study with a resilience agenda and signalled my approach as design research for resilience. The key research questions stated in Section 1.2 were translated into the three-phase research design, conceived as research *into*, *for* and *through* design, which was also shown to shape the thesis structure. The concepts foundational to the inquiry – resilience and regeneration, the question of type, practice theories and participatory design – were defined and foregrounded as conceptual threads for the study. This backdrop is extended and elaborated in the literature review of Chapter 2, the initial focus of which is food systems and food culture.

## Reconnecting ecosystems, food and housing: Literature review

### 2.0 Introduction

The review of the literature forming this chapter builds upon the global ecological status, post-sustainability design perspectives and foundational concepts – resilience and regeneration, the question of type, practice theories and participatory design – introduced in Chapter 1. The review spans the literature of contemporary food systems and housing, bridged by the topics of food spaces and food infrastructure. The scope of the review is bound by the research questions set out in Section 1.2, the social-ecological systems perspective they reflect, and my concern for scale and inter-scalar connections. I therefore focus primarily on the Australian context of the study, but also attend to its interplay with global conditions. My discussion interweaves international syntheses, accounts from particular regions and social contexts, and contrasting disciplinary developments. This literature takes the form of scholarly and technical works, in addition to popular and narrative material.

I also include three ecological design precedents, recognising the influential role of built artefacts as ‘texts’ in design discourse and design education. In this study, the precedents exemplify transferable social-ecological design knowledge, and aid my interpretation of design knowledge and ideological

positions encoded in material culture more broadly. Each serves as a departure point for further design exploration rather than an archetype – the more common role assigned to precedents in design literature.

I commence the review with a focus on the food system and food culture in Section 2.1, first drawing on works that reveal the state of the global, industrial food system, and its distortions and inequities. Recognising the role of design in routinely reinforcing this *status quo*, I distinguish food security and food sovereignty, and look to grassroots, alternative food movements as countering forces. I then identify the ‘cult of food’, or the transnational cultural phenomenon that has popularised food and cooking, as a further force to be mediated through design, based on the gravity of the global ecological status. Connecting food systems and housing in Section 2.2, I survey work on the spatialisation of the food system and food culture from contrasting disciplinary perspectives, including recent work on designing urban agriculture and emergent productive housing.

In Section 2.3, I structure my discussion of the literature of housing and its types by drawing parallels with the dominant food system, again with reference to social-ecological factors. Centred on Australian settings, I highlight the primary strategies for future urban growth, noting upward trends in higher density housing and rental tenure, and the significance of an investor-driven market. I then draw these observations into social implications for the future of housing, also to be mediated through design. In outlining approaches to sustainable housing in Australia, I compare the ‘technocratic’ orthodoxy with the less common integrated, social-ecological orientation. In Section 2.4, the three ecological design precedents illustrate integrated ecological design, and exemplify the concepts of regeneration, emergent types, participatory design, and design as pedagogy, in practice. I conclude the review by mapping two, key contextual domains for the study, positioning the existing suburbs in particular as an opportune site for ecological restoration and regenerative food production.

## 2.1 Food systems and food culture

The food systems and food culture literature is expansive, with multi-disciplinary concerns spanning ecology, politics, social justice, consumption, animal welfare, public health, and cooking and eating practices. In addition to scholarly texts, a genre of popular, investigative works has emerged seeking to raise public awareness of the social and ecological impacts of our global, industrial food supply. *The Omnivore's Dilemma: The Search for a Perfect Meal in a Fast-food World* (2006) by American journalist, Michael Pollan is notable among them, providing valuable synthesis of the complex technological developments and power structures that have shaped the contemporary food system. Following Pollan's lead, Section 2.1 functions to peel back the normalised face of the industrial food system, revealing ecological degradation, injustice and poverty. These dynamics are then contrasted with the ascendant counter-movements of food sovereignty and alternative food.

The majority of scholarly and popular works trace back to the prescient 1970s text by Frances Moore Lappé, *Diet for a Small Planet* (1991 [1971]), which gained little traction at the time. Moore Lappé's 'radical' ideas were marginal to those bound within Aldo Leopold's (1966; 1999) and Edward Abbey's (1988 [1968]; 1991 [1975]) foundational writing on ecological consciousness, conservation and the functions of wilderness. With a global perspective, Moore Lappé railed against the gross imbalance in power and resources that embedded poverty and hunger in many regions while the more affluent increasingly adopt high energy, processed diets which in turn degrade ecosystems and human health (1991 [1971]). Similarly, the pioneering work in nutrition and food policy of Marion Nestle (for example, 2002) was only recently linked to the food system, as an extension of ecosystems. Today, excessively meat-based diets and demand for animal feed feature as critical agro-ecosystem and food security issues in the United Nation's recent *Trade and Environment Review* (UNCTAD, 2013), echoing Moore Lappé's assessment. The overview of the current, dominant food system to follow, underscores its unsustainable, fossil-fuel dependence in sharp contrast to the regenerative food systems I seek to foster through design in this study.

## The state of the food system

The dominant food system from which we provision, cook and eat is now characterised by several abstruse orthodoxies: it is dependent on fossil fuel energy from production through to consumption; its business involves re-configuring a relatively small set of monoculture staple crops into a plethora of 'value-added' food choices; its distribution of food is more likely to be determined by trade agreements and commodity markets than human nutritional needs; and what we eat is decided largely by a conglomerate of large-scale agribusiness companies, giant food retailers and their marketeers. The critical departure from a food system fuelled by the sun, directly and indirectly, to one powered by non-renewable fossil fuels was communicated over three decades ago by American scientists David and Marcia Pimentel (1979). They pinpointed the extent of fossil fuel use along the entire food supply chain, to produce synthetic fertilisers and pesticides; to harvest, package, transport and store food; and for the journey from retailers to households. This energy intensity resurfaced in the term 'food miles' coined by British food policy scholar Tim Lang, and subsequently reported in *The Food Miles Report: The Dangers of Long-distance Food Transport* (1994) by Angela Paxton. Numerous comparative illustrations of fuel use and carbon emissions of local versus imported foods have followed, such as those of food system researcher Brian Halweil (2002). The energy expended in food production and transport often outstrips the caloric energy provided by the food itself, by a factor of thirty-six in the case of Halweil's 'transcontinental lettuce' (2002, p. 19).

Dependency on non-renewable energy is only one of a range of 'new fundamentals' Lang identifies for the future of the food system. In addition are climate change, water depletion, biodiversity and ecosystems loss, population growth, waste, land use, soil degradation, labour shifts, dietary change and public health (2010, pp. 90-94). The compound effect of these factors places the current food system in a new 'normal' state of crisis according to Lang, concurring with Australian science writer Julian Cribb in *The Coming Famine* (2010). Cribb anticipates famine not as a single event, but:

[A] nonlinear crescendo of events brought on by growing regional scarcities of land, water, nutrients, fuels, technology, fish and skills –

scarcities that are already interacting with and amplifying one another. These resonate with rising human numbers, an increasingly erratic climate, and our seemingly ungovernable appetites (2010, p. 189).

There is consensus that current processes of agricultural production, food processing, distribution and consumption are wasteful, inefficient and ecologically unsustainable relative to current and future demand (Belasco, 2006; Cribb, 2010; Lang, 2010; Smil, 2000; UNCTAD, 2013). Designing out waste so structurally embedded in the food system presents a significant challenge, demonstrated by the sheer scale of the global food distribution infrastructure. Paradoxically, this infrastructure delivers with great efficiency year-round supplies of fresh produce, irrespective of season, to retailers and consumers of the developed world.

The diversity of our current transport-dependent food choices is illusory, Lang (2010) argued, and has come at great cost to global biodiversity. Diverse plant and animal habitats have been cleared for agriculture, and agricultural crops have been selected and hybridised for maximum yield in large-scale monocultures, such as those American Midwest expanses of corn and soy beans described by Pollan (2006). Since the advent of refrigerated freight, food crop varieties have been culled further for their inability to withstand long-haul transport, present appealingly in supermarkets, and offer longer shelf life. The extent of biodiversity loss is so great in the view of resilience scholars Stephan Barthel, Carole Crumley and Uvo Svedin (2013), that they urge the protection of 'biocultural refugia', or regions with intact traditional ecological knowledge maintaining regenerative agro-ecosystems. Mosaics of traditional, diverse smallholdings characterise these refuge regions. I identify interdependence between such regional agro-ecosystems and re-localised food production as a resilience strategy, and pursue this through design in Chapters 6 and 7.

## Distortions and inequities in the food system

Contrary to reasonable expectation, the industrial food system, including its dominant institutions and types, does not function in order to provide nourishment for all people. It is foremost a global marketplace. It is also an

agglomeration of multiple, co-reinforcing factors that converged during the twentieth century: industrialisation, urbanisation, the expansion of the middle class, and the interdependence between expanding suburbs, car travel and a supermarket food supply. In its core operation however, the global food system is engineered by the World Trade Organisation's (WTO) General Agreement on Trade and Tariffs (GATT), to which there are now 157 signatory countries (WTO, 2012). To the numerous critics of the WTO and its globalisation agenda, its trade agreements function to cement poverty and hunger in the least developed regions of the world, especially for the landless and for women. Among the strident critics are scholar and former WTO intern, Raj Patel, author of *Stuffed and Starved* (2007), and Indian scholar-activist Vandana Shiva (2000). WTO trade agreements are charged with commodity prices fluctuations that greatly impact people and countries with very low per capita incomes. Staples such as rice, wheat and corn are traded globally in the manner of iron ore, crude oil and gold, their prices determined by markets in distant financial centres (where the dilemma is more likely choosing *what* and *how much* to eat).

These prevailing trade dynamics are being challenged, albeit minimally as a proportion of total trade value, by the Fairtrade movement founded in the Netherlands in the late 1980s. Fairtrade establishes agreements in developing countries with producers of, for example, coffee, tea, sugar, bananas and cacao. It guarantees a minimum price to enable sustainable production, promotes safe work conditions, and provides certification and distribution support. Also addressing retail acceptance, Fairtrade seeks to inform consumers of the social benefits to producer communities resulting from the agreed price premiums (Fairtrade Australia & New Zealand, 2012; Millstone & Lang, 2008). It is noteworthy that there now exist Fairtrade towns and universities committed to these principles.

Inequity persists, however, with 842 million people worldwide suffering chronic hunger between 2011-2013 according to the Food and Agriculture Organisation of the United Nations (FAO, 2014a). This is despite Moore Lappé's long-held position (1991 [1971]) that sufficient food is being produced in calorie terms to nourish the entire current global population, a claim supported recently by the United Nations (UNCTAD, 2013). The failure to distribute food fairly is



pinpointed as the root cause, with distribution understood to expand beyond trade and transport to include caloric food value consumed and wasted within Western diets.

Where economic growth is occurring, trends from China, India, Southeast Asia and Latin America suggest consumer demand for high protein foods such as meat, milk, fish and eggs will continue to increase (Cribb, 2010; Millstone & Lang, 2008; Smil, 2000). Consumption of these predominantly 'factory farmed' foods is already at high levels in the diets of Europe, North America and Australasia, and contributing to the correspondingly high ecological footprints noted in Chapter 1. Increasing production of animal-derived foods will require proportionately more grain production to feed the animals; what Moore Lappé refers to as 'shrinking' the grain supply to produce meat, wasting the grain's nutritive value and its potential to feed more people (1991 [1971]). In Australia, the United States and Canada, in excess of 50 per cent of all grain consumed is fed to livestock and thus shrunk in nutritive value (Millstone & Lang, 2008, p. 39).

The inability of ecosystems to withstand these levels of consumption provokes consideration of potential human responses. Capturing the ideological divergence, population scientist Joel Cohen (1995) presented three euphemistic schools of thought on addressing population and consumption. One school advocated 'putting fewer forks on the table' by limiting population and consumption expectations. Productivity and technological advances underpinned the option of 'baking a bigger pie', as exemplified by the yield-enhancing practices of the agricultural Green Revolution of the 1950s, 1960s and 1970s. Successive waves of 'technological utopianism', observed by historian Warren Belasco (2002), were also manifest in this technological option. A third option, 'better manners', encompassed a range of major changes to governance, the political economy and public policy that would redress entrenched inequities globally (Cohen, 1995, p. 370). Alternative food movements, as I elaborate in this section, align broadly with the third option.

Another consequence of growing demand for Western-style consumption extends the inequities of the food system to animals, as philosopher Peter

Singer and attorney Jim Mason argue in *The Ethics of What we Eat* (2006). Drawing on first hand accounts of intensive animal rearing, slaughter and processing, they discuss the ethical implications of three contrasting American family diets. Disregard for animal welfare in the food system has become the subject of several media exposés in recent years, raising public awareness but not yet widespread acceptance that, unless practising veganism as Singer does, we are all implicated to some degree through our normalised, daily food choices.

### Food sovereignty and food security

These critiques of the global food system make apparent that millions of people remain food insecure, and that global trade and commodity markets have progressively diminished the ability of countries and citizens to determine their trade policies and manage their food supply. This has been exacerbated by the expansion of biotechnology as Vandana Shiva has expounded in many fora. Shiva (2000) revealed how a concentration of powerful multinational companies has actively sought to lock farmers into cycles of dependency, in developing and developed countries alike. This has been achieved by limiting the ongoing viability of seeds through genetic modification, rendering seed-saving practices worthless, and the resultant crops reliant on the chemical fertilisers and pesticides formulated and sold by the very same companies. While the multinationals' profits are assured, rural livelihoods, health, traditions and biodiversity are being devastated.

Consequently, there is a growing literature reflecting civil and grassroots opposition to globalised trade, such as Raj Patel's *The Value of Nothing* (2010), and more specifically to how its dynamics are impacting people who produce food everywhere. This opposition is captured in the principles of food sovereignty, which anthropologist Marc Edelman (2013) traces back to Mexico in the 1980s. It has become more commonly associated, however, with the international peasants' social justice movement, La Via Campesina (LVC):

Food sovereignty is the right of peoples to healthy and culturally appropriate food produced through sustainable methods and their right to define their own food and agriculture systems. It develops a

model of small scale sustainable production benefiting communities and their environment. It puts the aspirations, needs and livelihoods of those who produce, distribute and consume food at the heart of food systems and policies rather than the demands of markets and corporations (La Via Campesina, n.d, para. 8).

Food sovereignty has a strong human rights orientation, with La Via Campesina (n.d.) stressing that the rights of food producers extend to lands, territories, water, seeds, livestock and biodiversity. This distinguishes it from food security, currently defined by the FAO as “when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life” (FAO, 2014b). The concept of food security pre-dated food sovereignty by around 50 years and was punctuated by the formation of the United Nations’ Committee on World Food Security in 1974 (FAO, 2012). The emphasis of food security has shifted in application, as Nicolette Larder, Kirsten Lyons and Geoff Woolcock (2012) explained in their Australian study. The focus expands from production and trade, to addressing the issue of social barriers to equitable distribution of food and the role of food in public health.

Food sovereignty is now being positioned as a *precondition* to food security (Patel, 2009; Schanbacher, 2010). This is also conveyed in Lang’s urging to move beyond “the three As - access, availability, and affordability ... to deliver sufficiency of production only on ecological terms, with sustainable food systems at the heart of international development” (2010, pp. 94-95). In developed countries these principles are being adopted by grassroots alliances, further defining alternative food movements in the process. In Canada, *Resetting the Table: A People’s Food Policy* appeared in 2011 (Food Secure Canada, 2011), and the Australian Food Sovereignty Alliance (AFSA) recently released *The People’s Food Plan* (Parfitt, Rose, Green, Alden & Beilby, 2013). The latter represents a social reform challenge to the Australian government’s unambitious and trade-focused National Food Plan green paper (DAFF, 2012). This literature highlights that the pursuit of food security and food sovereignty is not limited to developing countries, nor the field of international development. The complex situation that has arisen in food systems is what Lang describes

as “a triple burden of over-, under- and malconsumption, all coexisting, often within the same region and country” (2010, p. 89). In Australia, even with its weighty ecological footprint, in excess of five per cent of the population has been estimated to experience food insecurity (Rosier, 2011). Further, food insecurity was shown to be experienced most commonly by those who are indigenous, unemployed, in single parent households, and on low incomes.

Foreshadowing my discussion of the literature of food and space in Section 2.2, there is growing concern for the spatial and infrastructural dimensions of food insecurity and related ill health in several fields including public health, social inclusion, geography and urban planning. The Food Sensitive Planning and Urban Design (FSPUD) project in the Australian state of Victoria is one innovative example (Donovan, Larsen & McWhinnie, 2011). It urges future planning to redress the pattern of ‘food desert’ formation, which urban policy scholar Brendan Gleeson (2010) characterised as urban areas comprising lower-income housing, a lack of services and public transport, and the constrained mobility of residents to shop for nutritious food. In such localities, the availability of fresh food is typically limited, reinforcing the routine consumption of cheap, high-energy, processed foods and poor health patterns. Community and school gardens have emerged as key strategies in addressing food desert conditions and food insecurity, as I discuss in the following section.

### Home-based food production

Central to this study is the literature emerging on food production in the urban ‘backyard’ – a zone increasingly embracing all possible productive spaces surrounding housing – and community gardens as sites for enacting food sovereignty. Household food production was found to make a significant contribution to food security in Robin Kortright and Sarah Wakefield’s (2011) Toronto-based qualitative study, and similarly in Justin Schupp and Jeff Sharp’s (2012) quantitative study in Ohio. Other motivations expressed for growing food at home included environmental values, commitment to local food systems, and the role of gardening in health and well-being. Investigating if food sovereignty is being enacted through domestic food production in Australia, Larder, Lyons and Woolcock (2012) uncovered similar themes. For many respondents,

localising their food supply at the scale of the home was a means of challenging and opting out of the dominant food system, and of practising sustainable living.

The motivation to garden in response to economic hardship (in Schupp and Sharp's study) revives imagery of depression relief gardens and wartime 'victory gardens' throughout Europe, North America and Australasia, as chronicled in the United States by landscape architect Laura Lawson (2005). Charting the post-colonial Australian experience of localised food production to the present and through two World Wars, historian Andrea Gaynor (2006) observed that while waxing and waning, food production has been continuous in Australian backyards. With shifts to higher density living, Lawson and Gaynor both identify that contemporary community gardens now serve multiple, interwoven agendas, with emphases on a garden's particular urban context and demography. Collectively, these accounts revive the imperative for access to productive urban land and know-how, the latter referred to as 'social-ecological memory' by Stephan Barthel, John Parker and Henrik Ernstson in their work on the role of allotment gardens in building resilience (2013, p. 5). In this design research, these interwoven agendas re-surface in the social-ecological analysis of Chapter 5, and inform my ethnographic engagement with localised food sovereignty in action, in the homes of participants.

### Food counter-movements: Alternative, slow and local

Underpinning the web of contemporary food counter-movements are persistent threads of the broader countercultures of the 1970s, then coalescing around threats to energy supply, ongoing conflicts, and environmental concerns amplifying since Rachel Carson's *Silent Spring* was published in 1962. A rich, vicarious experience of this formative period of social ferment is offered in *Appetite for Change: How the Counterculture took on the Food Industry, 1966-1988* by Warren Belasco (1989). In Australia, people fled urban centres to adopt the goal of self-sufficiency in the late 1970s and early 1980s, akin to those heading for the country and setting up smallholdings in Britain. Palpable nostalgia for the rural and natural – a likely rejection of modernity – was discernible within these social shifts (Davis, 1979; Relph, 1987). One enduringly influential and practical guide aiding those making the move was *Permaculture*

1, released in 1978 by Bill Mollison and David Holmgren, who were introduced in Chapter 1 as the co-founders of permaculture and its ecological systems design for 'perennial human settlements'.

Meanwhile in the United States in the 1970s, an alternative economic model of agriculture with roots in Europe – community-supported agriculture (CSA) – was budding across the country (McFadden, n.d.). Among the myriad alliances, projects and initiatives that now collectively comprise an alternative food movement, permaculture, CSAs, farmers markets and community gardens are resurgent, re-cast practices. For participants, food is intractably social, political and ecological; sociologist Alison Alkon (2014) identified activities spanning social justice, labour reform for food workers, and policy initiatives banning chemical use. 'Alternative food' is a unifying medium for grassroots action on a range of issues. Food-producing forms a key thread, for example, in the resilience-centred Transition Network movement that emerged in Ireland in 2005, led by permaculture teacher Rob Hopkins (Hopkins, 2008). Responding to dwindling fossil fuel reserves and climate change, Transition groups are self-organising and mobilise at the scale of communities, towns and regions to rebuild their adaptive capacity through re-localisation strategies (Transition Network, 2013).

Sharing an international, devolved, self-organising membership structure with the Transition Network is the otherwise idiosyncratic Slow Food movement. Slow Food was seeded out of protests against the advance of globalised fast food in Rome in the mid 1980s, such that its original agenda was dually political and gastronomic (Petrini, 2002). Through its reach in developed countries in particular, the gastronomic emphasis has invited intersection with, and support from pleasure-seeking, urban 'foodies'. Slow Food has consequently attracted criticism on elitist grounds including that of American food activist and scholar, Laura Delind (2006, 2011). While Slow Food's manifesto has become more responsive to ecological and social justice issues, my experience of membership in four countries resonates to a large extent with Delind's objections, namely the priority assigned to gastronomic pleasure by affluent 'foodies'.

Slow Food now merges food sovereignty with its original opposition to 'fast life', the safeguarding of regional food traditions, and reviving the sensory, convivial pleasures of food. This evolutionary shift was articulated by founder, Italian journalist Carlo Petrini, in *Slow Food Nation* (2007), and documented at the time by the food and development policy group, Food First (Holmes, 2007). The shift was also consolidated in the renewed mantra of 'good, clean and fair' (Petrini, 2007). Irrespective of one's position, a valuable Slow Food notion is that of the 'co-producer', which marries food producers *and* consumers in a direct relationship of mutual support and responsibility. Co-production captures well the agency exercised through participation in alternative food systems, in the manner Wendell Berry urged in *Bringing it to the Table* (2009).

The influence of Slow Food arguably extends beyond its membership for two key reasons. First, it has generated an articulate literature in multiple languages, contributing to vibrant popular and scholarly discourse around the issues upon which it was founded and those it has latterly embraced. Second, it has helped popularise the pricelessly simple term – 'slow' – to express resistance and opposition to all that is 'fast' and 'industrial'. Testament to this are *Cittaslow*, the slow towns' counterpart to Slow Food (Cittaslow International, 2011); slowLab's 'slow design' principles (Strauss & Fuad-Luke, 2008); Slow Architecture, as taught at the Glasgow School of Art (Crotch, 2012); and the Slow Housing manifesto proposed by American community lawyer, Janelle Orsi (2011). 'Slow', together with 'local', have become emblematic of the broader array of alternative food networks beyond those profiled above. In a critique from the perspective of 'slow tourism', however; C. Michael Hall (2012) observes that due to the failure of Slow Food to confront systemic factors, such as the right to travel, the 'slow' label will likely be reduced to a commodity itself.

More broadly, scholars have cautioned against accepting that from advocating local food systems, improved social and ecological outcomes will logically follow (Delind, 2011; Hinrichs, 2003; DuPuis & Goodman, 2005). Widening the criticism on social justice grounds, Singer and Mason (2006) argued that localism potentially breeds self-serving communities that actually possess the means to consciously buy Fairtrade or sustainable goods sea-freighted from abroad, and in turn improve conditions for impoverished producers. Delind's

critique implicates the 'locavore', or the 'foodie' who commits to shopping and eating locally, in such individuated, self-serving consumption, absolved of the responsibility to grapple with messy, community-driven social change (2011, pp. 275-277). Pollan's guiding food principles set out in *In Defense of Food* (2008), are also critiqued by Delind for their lack of social context, in turn inviting appropriation of the label 'local' by the very institutions opposed by localism; Wal-Mart in this case (2011, p. 277). In a point pertinent to social-ecological systems and ecological design, Delind made the assessment:

[T]here is little in Pollan's eating directives that overtly reinforces Dahlberg's notion of a multi-layered, regenerative food system, one in which redundancy (maintained through both biological and cultural diversity) sustains the processes and structures of a living system (2011, p. 279).

Arguably, Pollan has succeeded in raising broader awareness that, for some, has prompted a more critical engagement with food in local contexts. The critical commentary on alternative food movements, coupled with practical and narrative accounts, are particularly relevant to this study and for re-visioning food systems at the scale of the home. They intimate not only the tensions, but the kinds of provisioning, cooking and eating practices ecological design might strive to facilitate, while framing alternative food as an heterogeneous set of activities.

### Alternative food movements and the cult of food collide

The inexorable rise of the cult of food is a parallel development characterised by a barrage of food-focused media, the status and celebrity accorded television chefs, and cooking and eating as core cultural activities. This popular frenzy of cooking, eating and knowing about food is at the epicentre of closely linked activities including the renewal of homes and kitchens, and leisure travel. While millions are in the thrall of the *Masterchef* television franchise (MasterChef, n.d) or *The Great British Bake-off* (BBC, 2012), Frances Short's (2006) study of the meaning of domestic cooking is a reminder that not everybody is cooking and eating with similar gusto; the tasks of shopping and



feeding a family can still remain tedious and unrewarding for many. Among those who prefer not to cook, are people who engage avidly in the spectacle of food, and who are thoroughly entertained by food media, as Pollan identifies in *Cooked* (2013).

Talking about food is certainly popular, with some voices more salient within food system debates than others, Pollan being a prime example. In Britain and beyond, television chef Jamie Oliver has lobbied for an overhaul of school meals, attempting to wean the young off fast and ultra-processed food (while now marketing his own line of healthier options). In Australia, high profile cook and writer Stephanie Alexander has initiated a program of over 400 school kitchen gardens (SAKGF, 2013; Yeatman, *et al.*, 2013), in a strategy similar to that of Alice Waters in the United States. Through texts, television, online media, and events, these faces are among the luminary defenders of sustainable food and public health. Narrative accounts, such as *Animal, Vegetable, Miracle* by Barbara Kingsolver (2008) and Ben Hewitt's *The Town that Food Saved* (2009), offer further exposés into alternative food lives, as do the flourishing social media of food.

The phenomenal proliferation of food talk and imagery enabled by digital media, such as blogs, the micro-blogging service Twitter and mobile devices, now poses a vibrant site of inquiry. Media scholar, Signe Rousseau, details the interactions of virtual food communities, charting the rise of food bloggers to celebrity, and probing related ethical issues such as 'culinary plagiarism' (2012, pp. 18-25). Alternative food movements appear marginal and jostle for attention in the cacophonous food media Rousseau depicts.

The consumption-driven cookbook mill is another key component of the cult of food. Its proliferating tomes tend to reflect the transport-dependent availability of produce year-round, untethered by place or season. Cookbooks also reflect the routine consumption of meat, dairy and eggs, intensively factory-farmed by default, and an eternal fish supply. That is not to exclude the abundant 'recipes' emanating from the processed food industry in which tinned-this is assembled with a sachet-of-that to create concoctions as iconic, in Australia at least, as the

chocolate crackle (agglomerates of puffed rice, cocoa, sugar and copha). To Cribb, the legacy of the cult of food will be nothing short of apocalyptic:

The year is 2085 and Yasmin's teacher has taken the small class to the local museum. Their assignment is to discover how their ravaged world has come to be. ... [A] single ray illuminates an object displayed on a blackened pedestal... As they draw closer they begin to feel its power. ... [A]t last they can make out what it is, this fount of all ruin, the suffering, the hunger, the loss. It's a cookbook (2010, p. 187).

Dramatic imagery aside, Cribb's claim that cookbooks rarely advise of the ecological costs of eating and of our indulgences, holds true. In Chapter 5, I take up this thread by arguing that cookbooks (and celebrity chefs) reinforce the unsustainable *status quo* by directing our food choices and cooking practices. The consumption practices embedded in the cult of food collide with core principles of the alternative food movements, particularly where food-producing is integral to broader resilience strategies. These consumption practices are also reinforced within food space types, and I next examine the literature focusing on their interplay in spatial-material contexts.

## 2.2 Interplays of food and space, food and infrastructure

Food spaces and the infrastructure of the food system have emerged from the materialising practices of craft, planning and design since the formation of human settlements, privileging some activities and constraining others through their types, as introduced in Chapter 1. My emphasis in this section is on the spatialisation of food, its widening interdisciplinary nature, and the conceptual tools on offer to this study. Architectural perspectives present an obvious starting point, highlighting both historical and contemporary relationships between food and space at a range of scales.

Shaping the entire urban form of London, for example, are routes once trodden by livestock en route to slaughter and marketplaces erected in proximity to river-borne cargo, as architect Carolyn Steel revealed in *Hungry City* (2009). Of

equal interest to Steel, are the contemporary planning policies that have enabled supermarket complexes and parking lots to flourish, marrying food and cars on the urban fringes (2009, 2012). In another manifestation, the cult of food was spatialised in nothing short of an “exploding gastroculture of restaurants and food stores”, in design scholar Karen Franck’s account of cornucopian New York City (2005, p. 36). In this context, design practice serves a luxury food culture and defines its spatial types, at the exclusion of more affordable forms of eating and provisioning.

In an investigation of eating spaces, food styles, food preparation and their interstices, Australian design scholars Rachel Hurst and Jane Lawrence (2005) proposed a typology of eating places based on Lévi-Strauss’ (1979) gastronomic metaphor of the raw, medium and well done. A ‘raw’ notion of food spaces as dynamic, flexible and ephemeral intersects with Franck’s (2005) work on food and the city and is potentially fruitful for ecological design in support of alternative food movements. The examples of collapsible weekly farmers’ markets, and hole-in-the-wall daytime eateries (shuttered at night) hint at shared spatial resources, and temporal windows for balancing amenity with lowered energy use, and the visceral reality of recycling food waste. In Franck’s (2002) earlier volume on food and architecture, contributor Gabrielle Esperdy explored marketplaces, in particular, under the banner of ‘edible urbanism’ (2002, pp. 44-50). This foreshadowed the proliferation of urban food spaces – both market-based and productive – to appear since. These emergent types are discernible in the design projects profiled, for example, by April Philips in *Designing Urban Agriculture* (2013).

Centred on domestic architecture and its evolution, the ‘food axis’ posited by architectural historian, Elizabeth Collins Cromley (2010) is of great utility to this study. As defined in Chapter 1, the axis offers a conceptual means of relating the dynamics of food provisioning, storing, cooking and eating, historically and spatially (in both horizontal and vertical planes). In her survey of American housing, Collins Cromley (2010) traces the shift from distributed, agrarian food axes to those conflated within contemporary kitchens, but also now extending into other zones of the house aided by convenience foods. Application of the concept is demonstrated through my exploration of the kitchen’s past, forming

one of four social-ecological readings in Chapter 5. Applied further to ecological design, the food axis also offers a design heuristic, in an approach I develop through the design iterations of Chapter 7.

Zooming into the scale of the kitchen and its appliances, 'normalisation' offers another fertile concept, presented by the fields of sociology and material culture studies (for example, Shove & Southerton, 2000; Shove, 2003; Shove, Chappells & Lutzenhiser, 2009). In their account of the domestic freezer's trajectory to normalisation in Britain, Elizabeth Shove and Dale Southerton (2000) promoted a critical scrutiny of 'normal' things, related practices and co-determining, invisible infrastructures. In a concluding statement, they observed:

As well as depending on a reliable electricity supply, and accommodating kitchen designs, freezers presuppose a network of manufacturers, frozen-food producers, global transport systems and agricultural practices (2000, p. 315).

By extension, all domestic food spaces can be seen as nodes, co-determined by dominant practices and technologies. The case of the freezer also prompts critical questioning of the existence of other food infrastructure dependencies which run counter to the goal of redundancy in ecological systems as promoted by Dahlberg (1993), and reiterated by Delind (2011).

Scaling outward beyond the home and adopting a systems perspective, design and planning scholars André Viljoen and Johannes Wiskerke (2012) usher in integrative food planning that transcends the urban-rural dichotomy still common in planning. In assembling contributions from governance and policy, through ecological science, urban design, urban agriculture, and health and community development, they make tangible the kind of social-ecological inquiry called for by the resilience strategies introduced in Chapter 1 (Moberg & Hauge Simonsen, 2011). A component of this new work builds on the Continuous Productive Urban Landscapes (CPULs) proposed earlier by Viljoen and Joe Howe (2005). CPULs reconceptualise urban green space as sinewy, interlinked productive and recreational tracts, connecting housing and community nodes, and extending out to meet peri-urban agriculture.

Appropriating existing roadways and contracting transport infrastructure are aspects of this vision. CPULs position food as an urban priority equal to that of housing and profoundly challenge the dominant 'compact city' urban planning orthodoxy, on which I elaborate in Section 2.3.

The approaches to designing food places and productive infrastructure profiled by Mark Gorgolewski, June Komisar and Joe Nasr in *Carrot City* (2011) are similarly integrative and scalar. Through built and conceptual examples at city, community and dwelling scales, the coupling of urban agriculture and productive housing is given expressive form. Productive housing, as noted in Chapter 1, is an emergent housing typology integrating food production, and underpinned by a systems approach. Gorgolewski, Komisar and Nasr (2011) also give pragmatic attention to technical components and considerations for use of roof and vertical spaces, highlighting the mix of horticultural, engineering, planning and design expertise demanded in the realisation of urban agriculture and productive housing. These factors, in addition to social considerations for mixed-use urban renewal projects, are illustrated by the first precedent, the Maison Productive House in Montreal, in Section 2.4.

A complementary way of thinking about productive housing is as a form of adaptive design, based upon a vision for the cumulative re-purposing of existing housing which American designers, Kathleen Brandt and Brian Lonsway (2012) termed an 'adaptive re-use of the suburbs'. An illuminating case is the Integral Urban House, 'life support system', located in Berkeley, California by Helga and Bill Olkowski, Tom Javits and The Farallones Institute (2008 [1979]). Following the adaptation of this nineteenth century house by the authors, it was opened to the public as an educational setting. While the house has since reverted to private occupation, its adaptive state is the focus of the second design precedent in Section 2.4.

Collectively, these latter works document past and current re-visioning projects, integral to social-ecological developments in food systems. They also foreshadow design research contexts for exploring new typologies in housing design, as suggested by the contrasting design precedents to follow in Section 2.4. First, however, I establish the conditions with which ascendant alternative

food movements and planning are transecting, by consulting the literature of urban form and contemporary housing patterns in Australia.

## 2.3 Housing and food system parallels

Reflecting on the preceding exploration of the food system, strong parallels in the dominant housing system emerge, discernible within Australia and in other developed settings. In common with food, housing provision and access is mediated to a large extent by markets, both capital and rental. Housing transactions also generate speculative gain akin to food commodity market transactions, albeit over more protracted timeframes. Delivery to householders, as with food, results from complex historical, regulatory, commercial and logistical negotiations positioning the end users of housing, like eaters, at the end of distant decision and supply chains. The genuine ecological costs of housing, assessed on a lifecycle basis from material extraction and production, through construction, and ongoing use and operation, are also routinely externalised in the manner of food.

Housing is targeted too by an array of sustainability and social justice initiatives, with agendas redolent of those dedicated to food. Related explorations of identity and cultural capital centred on housing and the home can be similarly tapped to enrich understandings of contingent practices, in common with works on food culture. In terms of the cultural and social significance of housing, parallels with the cult of food are reflected in an expansive lifestyle media spanning architecture, design, decorating, furnishings, homewares, gardens and landscaping. In turn, this corresponds to a burgeoning commercial sector urging perpetual renewal of the home.

Across the literature of housing design, housing theory and urban studies, productive housing represents little more than a nascent niche. In the Australian setting, the vociferous debates revolve around housing supply, affordability, and urban growth and development strategies. Escalating energy costs and transport concerns are salient themes in the attendant popular debates. House prices and new home building approvals are keenly monitored too, and are used to provide reductionist snapshots of the nation's economic health. De-

centred from this political-economic focus but inextricably linked, housing is also a rich site for scholarly and applied research on social inclusion, social cohesion, and the roles of housing in health, disability and ageing. In addition to the interest of designers and architects working at the residential scale, housing also commands the scrutiny of social historians, cultural theorists and anthropologists, offering fruitful disciplinary intersections.

While drawing on parallels with the food system for the purposes of analysis, I pursue selected themes in this section in order to locate the study in the Australian context, and for exploration of ways of re-coupling food and housing therein. My discussion coalesces around urban form, housing supply, and the social and ecological impacts of housing. This focus intersects with the key environmental, demographic and affordability debates identified within Australian housing by architects Geoffrey London and Simon Anderson (2008). More detailed exploration of the social and cultural significance of housing, and the kitchen and foodways in particular, forms the social-ecological analysis of Chapter 5.

## Housing and urban form in Australia

Housing shapes, and is in turn shaped by urban form, in concert with other political, economic and cultural drivers. Australian cities and urban centres, while undergoing major transformations resulting from urban consolidation agendas over recent decades, possess a persistently spacious, suburban form as observed by urban policy scholar Clive Forster (2004). Owner-occupied, detached housing became iconic in the national imagination according to chroniclers of Australian housing, Stella Lees and June Senyard (1987), Alastair Greig (1995), and John Archer (1996). Updating this commentary, Andrea Gaynor attributed Australians' staunch values for autonomy and privacy to this atomistic housing form in her environmental history, *Harvest of the Suburbs* (2006).

The most recent figures for all housing types indicate 5.8 million owner-occupied dwellings, against a backdrop of 8.6 million total households (ABS, 2013). A considerable portion of these dwellings occupy urban form prescribed

in the decades following the Second World War, as Greig (1995) observed, according to dominant values of modernisation and economic expansion. Today, the prevalence of, and desire for home ownership positions the residential property market front and centre in Australian life. Within this market, the majority of more recently built housing stock has come into existence via large-scale, greenfield developments and volume builders. The Australian housing market's alacrity in providing consumers with off-the-shelf, popular housing is longstanding with the 'model home' phenomenon and its appeals to lifestyle unpacked vividly by architectural scholar Kim Dovey (1994). Such housing contrasts with the minor share conceived professionally by designers and architects, and with earlier indigenous and colonial vernacular housing built by occupants and their forebears.

These important distinctions in housing types and tenure, long since identified by architectural and housing scholar Amos Rapoport (1969) in *House, Form and Culture* and revisited in later works (1977, 2000), are of enduring interest. With home ownership rates declining, and increasing numbers renting (ABS, 2013), the early, unequivocal position on home ownership of eminent architect and theorist, Christopher Alexander, and co-authors, applies equally in Australia today:

People cannot be genuinely comfortable and healthy in a house which is not theirs. All forms of rental – whether from private landlords or public housing agencies – work against the natural processes which allow people to form stable, self-healing communities (Alexander, Ishikawa & Silverstein, 1977, p. 393).

Alexander's deep opposition was toward housing built for speculation and rental profit – as is rife in contemporary Australia – though he conceded that modified forms of rental may mitigate the problem of tenants having no control or stake in the development of their home environments. This important issue of tenure recurs in relation to housing supply, and the social implications of the housing future being shaped by the dominant urban planning agendas, accounts of which follow.



## Urbanisation and the compact city agenda

Against the global backdrop, Australia's five major cities remain small and spacious, despite several decades of accelerated growth. Worldwide, there are now at least 500 cities with populations exceeding one million. Highlighting this rapid urbanisation, landscape architect James Corner noted there were only sixteen such cities at the beginning of the twentieth century, with mega-cities of populations exceeding ten million now on the rise (2006, p. 7). In *Planet of Slums*, author Mike Davis (2006) estimated the existence of at least 200,000 slum settlements worldwide, the largest often linked with mega-city formation as in the case of Dharavi in Mumbai, India. Following North America's sprawling, car-centred urban example however, Australian cities have still arrived at what landscape scholar Richard Weller described as the "rapacious, denatured tangle of infrastructure problems and planning issues increasingly subject to base motivations" which characterise the contemporary metropolis (2006, p. 71). Unsurprisingly, debate over the optimal urban form to pursue in tandem with population and economic growth – whether decentralised, multi-centralised, consolidated, or in some combination – has been underway for several decades (Forster, 2004).

In gradual recognition of the infrastructural, social and ecological implications of unchecked urban growth on the fringes of our cities, Australia's three largest cities – Sydney, Melbourne and Brisbane – now share a strategy for accommodating projected growth via the 'compact city' model (Randolph, 2006). This consolidated planning model utilises infill sites and the renewal of redundant sites for higher density housing development, typically comprising high-rise and low-rise apartments and semi-attached dwellings. Collectively, the three cities are aiming to construct over one million new higher density dwellings within the next three decades (Randolph, 2006, p. 476). In Melbourne to date, targets for this kind of urban consolidation have fallen short according to urban policy scholar Michael Buxton (2014). He charges developers with lobbying authorities to redraw the boundaries of urban growth limits in order to continue to build detached, and more profitable, housing on the urban fringes. In parallel, the new inner urban housing being constructed is increasingly high-rise in form, detracting from the amenity of these areas, and ill-matched to the preferences of home buyers, in Buxton's view.

The compact city urban vision represents a significant shift in the Australian context. For nearly a century, Australian urban form had more in common with Frank Lloyd Wright's (1932) 'Broadacre City', critiqued by Carolyn Steel (2009) for its utopianism, than the historically denser European cities and towns from which large numbers emigrated to Australia following the Second World War. The compact city agenda has been fuelled further by protracted crises of housing affordability and supply, which remain contested as I next outline.

### Housing crisis: The new normal

Tim Lang's (2010) summation of the food system as now being in a 'normal' state of crisis, can be applied equally to Australia's widely documented housing crisis (Forster, 2004; National Housing Supply Council, 2012, 2013). The causes and extent of the crisis have become obscured however, although there is consensus on a crisis of affordability, especially for people on low incomes and first time buyers (ABS, 2013; Gleeson, 2010; NHSC, 2013). The prevalent trends however, indicate more people renting in general, and increasing numbers of high- and medium-density rental dwellings, based on 2011-2012 data (ABS, 2013) and the NHSC's (2013) final report. Outright home ownership is also decreasing for people of all ages, with young adults remaining longer in parental homes. Affirming the affordability crisis, the number of people occupying crowded and marginal housing is also on the rise. Characterising the housing reality in Sydney's outer suburbs, Gleeson (2010) describes householders condemned to buying houses bigger than they need due to limited availability; they are expensive to run, and require gruellingly long commutes to work from poorly serviced suburbs.

Basic housing provision in Australia, as suggested above and reinforced by Randolph (2006) and fellow housing scholar Wendy Steele (2012), is largely driven by capital investment. The resultant market conditions are especially hostile to assigning priority to housing that is both affordable and sustainable, as reported by the Australia Housing and Urban Research Institute (Wiesel *et al.*, 2012). Conditions are equally challenging for realising housing projects that respond optimally to the needs of indigenous people, people with disabilities, people on low incomes, and the elderly. Deeming the future bleak for such

groups with unmet housing needs over a decade ago, the observation of Australian urban studies scholar, Terry Burke, still holds:

The dependence of the housing system on individualism and private gain creates a social and political context whereby the winners (... a sizeable majority) have little awareness of, or concern for, the losers, with the result that there is little political support for housing reforms of a redistributive nature (1999, p. 128).

Accessible, neighbourly and sustainable housing, as promoted by inclusive design advocates Edward Steinfeld and Jonathan White (2010) in North America, is therefore a rarity in Australia. Similarly, the pursuit of adaptable and flexible housing in response to changing household structures over time, technology shifts, and the potential merging of home and workplace (London & Anderson, 2008; Schneider & Till, 2007) is limited in Australia. Instead, housing for which there has been strong market demand is likely to be more specialised, such as inner urban student housing and speculative 'over-55 villages'. In relation to the ageing population, progressive shifts in government policy targeting aged and disability care increasingly favour adaptation of existing housing stock over high cost, purpose-built public facilities. Home ownership is re-positioned in this light as an important mechanism in policy implementation, and in providing future flexibility to householders (Olsberg & Winters, 2005). Housing clearly performs multiple social functions, relative to demographic and policy shifts, to which market mechanisms alone cannot respond. I therefore comment below on the social implications of current and future housing trends.

### Social implications of our housing future

With a goal of re-coupling food and housing, the social implications of the compact city and higher density housing invite greater scrutiny in light of the apparent polarity between market forces and ascendant social values. Overall, the social outcomes of future housing are poorly understood in Randolph's (2006) view, and are based on some simplistic assumptions on the part of planning authorities, typically deemed 'community blind' by Steele (2012). In the provision of shelter, as in the provision of food, the market is not geared to

deliver positive social outcomes, for which there is a widening and unmet demand.

The inequities present in the current housing situation manifest in settings that, for example, foster social segregation and isolation, lack amenity and services, and as Cook and Swyngedouw (2012) identify, force exposure to environmental hazards such as pollution and heavy transport infrastructure. While poor amenity and environmental hazards are not limited to higher density housing, Gleeson (2010), Randolph (2006) and Steele (2012) concur that its expansion is already compounding undesirable outcomes for householders. This is experienced most in lower value flats and apartments for which rental demand is perpetuated by the shortfall in affordable housing. Poor construction quality invites disputes over noise transmission, and there is little incentive for property owners to re-invest in maintenance and repairs. Urban centres adjacent to transport hubs and major roadways are targeted by developers as lucrative locations for these new, low-cost developments (Randolph, 2006), without any regulatory requirement to address liveability for rental tenants, the most likely residents.

In a parallel with eaters distanced from decisions over the constituents of their food, renters, and property owners in some cases, are distanced from exercising agency over significant aspects of their housing environment. Highly relevant in the context of this study, are the swelling ranks of householders subject to a new norm of containment in the *way of living* in their immediate environment, due to renting within the strata title framework. Strata title owners' corporations are primarily concerned with regulating householders' behaviour, as Easthope and Randolph (2008) observed, with representation on these management bodies limited by statute and subject to abuse. This underscores the challenges to be faced in attempting to gain consent for the use of balcony and common spaces for food growing, and related activities such as composting and rainwater collection.

Illustrating the intractable link with household practices, renters in such higher density housing cannot modulate the noise transmission and thermal performance of the building, its orientation, layout, glazing and shading, nor the

energy and water use performance of pre-determined fittings and in-built appliances. Owners, however, are able to effect some changes, subject to the owners' corporation rules. This reality aligns with Birkeland's claim that 90 per cent of a building's environmental impact is 'designed in' prior to construction (2008, p. 9). Motivated renters may only modulate their household practices related to consumption, energy, water, and waste within certain parameters. In many buildings it may even be forbidden for washing to be air-dried on balconies, forcing the use of electric dryers. As mentioned, there is also the need to negotiate the use and maintenance of other common facilities and open space, including green space. This degree of prescription at the household scale represents a significant cultural shift from the owner-occupied, detached house and garden, except as Randolph (2006) noted, for those relocating to Australia who may be more culturally predisposed to higher density living.

In a further parallel with the food system, there also exist some countering measures to these dispiriting conditions. The concept of 'social sustainability' has filtered into urban design and housing design, gaining traction too within emergent urban agriculture design. Social sustainability formed one of the three sustainable development pillars in *Our Common Future* (WCED, 1990), and its principles centred on the equitable provision of basic human rights and living standards, democratic processes, and acceptance of diversity. In the refinement and application of these principles to urban design and housing, the incisive writing of North American urban advocate Jane Jacobs has been influential (for example, 1961, 2004). Jacobs' ideas and critical commentary connect conceptually with work on social cohesion (Cook & Swyndedouw, 2012), and liveability, community-building and neighbourliness (Orsi, 2011; Schneider & Till, 2007; Steele, 2012; Steinfeld & White, 2010).

In Australia, an urban design protocol, *Creating Places for People* (Department of Infrastructure, 2011), articulates pragmatic strategies for fostering social sustainability at a range of scales. This highlights the potential of yards, streets and interconnecting green spaces as the basic fabric of an ecological urbanism (Mostafavi, 2010). In a similarly connected, encompassing sense I view housing as 'more than the dwelling', in Rapoport's (2000) parlance, which leads to

considering the primary approaches to sustainable housing, in Australia and beyond.

## Sustainable housing perspectives

In 1960, modernist architect and critic Robin Boyd published a florid critique of Australian architecture, aesthetics and culture, *The Australian Ugliness*. Featurism, or the arbitrary and incoherent application of architectural elements, outraged Boyd's functionalist sensibilities. In his critique, the national character was indicted for its superficial values. Arguably, aspects of Boyd's critique endure, but given the ample ecological footprint established in Chapter 1, an updated critique along the lines of 'the Australian profligacy' is perhaps in order. Despite the recent shift to higher densities, most Australian housing occupies vast, car-dependent suburban tracts, is wastefully over-sized, thoughtlessly sited relative to sun direction, light and airflow, weakly regulated, and therefore constructed to minimal ecological performance standards (Birkeland, 2008; Burke, 1999; Forster, 2004). Cheap, subsidised energy has been the panacea for regulating extremes of climate and transporting householders ever further to work, shops and services, partly explaining why Australian houses are among the largest in the world (Dowling & Power, 2012).

This assessment does not do justice to the flourishing, although still marginal, sustainable housing movement with its genesis in the genuinely experimental and alternative housing appearing in Australia and elsewhere from the 1970s onward. Again, there is a strong parallel between this emergence and the counter-culture revolving around food that took root in the same era across continents. The contemporary literature of sustainable housing – scholarly, technical and popular – is suggestive of two distinct orthodoxies: the dominant technocratic and mainstream 'greening' approaches, and in contrast, integrative, social-ecological approaches. I discuss these below, including examples of the latter approach.

The dominant, technocratic approach is characterised by an atomistic emphasis on individual dwellings, tools such as energy rating schemes, and the substitution of green components that uphold conventional construction norms

and urban form. I develop this notion of ‘green counterparts’ in relation to kitchen design in Chapter 5, arguing that they maintain the unsustainable *status quo*. Expanding Birkeland’s (2008) critique of technocratic approaches to sustainable building, architectural scholar Simon Guy (2010) mapped diverse understandings of sustainable building. Urging socially grounded approaches, Guy balanced his argument with recognition of the benefits that performance-oriented sustainability approaches have brought about. This is reinforced by the Green Building Council of Australia’s (GBCA, 2013) recent, independently assured report that presents improved performance data for 428 ‘Green Star’ rated building projects from the past decade, compared with standard practice.

Demonstrating the second approach to sustainable housing – the integrative and social-ecological – and belying its title, is the Australian *Your Home Technical Manual* (DCCEE, 2010). Targeting housing designers and householders, it addresses climate zones, urban setting, streetscape, biodiversity, stormwater, noise, home adaptability and health, transport, safety and bushfire risk as integral to house design. This approach weighs toward Yeang’s (2011) four strands of ‘ecoinfrastructure’, and the interlinking of scales and systems in Mostafavi’s (2010) ecological urbanism, both of which were introduced among the post-sustainability perspectives in Chapter 1. Collectively, these social-ecological works are most aligned with, and offer robust guidance to, this study.

Popular accounts of both retrofit and new-build housing approaches also offer guidance as to how integrated, ecological design principles might be realised. Michael Mobbs’ *Sustainable House*, first published in 1998, is a prominent Australian example. Mobbs shared his family’s painstaking decision processes as they retrofitted a compact, inner Sydney terrace house with solar energy, water and waste recycling systems, and other ecological design features. Importantly, he also discussed in detail the family’s contingent household practices and their role in optimising the new systems, as well as challenges they experienced. Mobbs has since opened the house to the public, reporting in excess of 19,000 visitors (Throsby, 2012), and as I elaborate in Chapter 7, providing a compelling learning and engagement model.

The quest of architects Brenda and Robert Vale to build a new family home, off the grid and with on-site services, is one shared with growing numbers electing to build for self-sufficiency in Australia. Documenting their British example in *The New Autonomous House* (2000), the Vales gave lengthy consideration to siting for sun access, and advocate a range of alternative technologies. Those living in conventional housing would likely experience some dissonance with the level of user engagement demanded by this design and what was deemed as 'sufficient'. Their reasoning however, is difficult to fault:

In the autonomous house, resource depletion begins at home: it is possible for the occupants to misuse their resources without damaging anyone but themselves. ... This relationship between user and resources, and the effect this has on the Earth as a whole, constitute an important step in putting people in control of their circumstances. People may learn to value a resource if they appreciate the effect of scarcity (2000, p. 39).

The direct relationship expressed here between the home, its use and resources demonstrates the interplay between spatial-material house form and householder practices. This interplay is rarely foregrounded as a sustainable housing design concern; normalised householder practices are more or less given (for example, Harrison, 2013; London & Anderson, 2008). However, two Australian studies help to shed light on the dynamic, and the recurrent issue of tenure. Studying the sustainability decisions of Australian householders, Kelly Fielding and co-authors (2010) found owners were more likely to take water and energy efficiency actions, as well as curtailment (conservation) actions than tenants.

In their study of sustainable, affordable housing, Ilan Wiesel and co-authors (2012) questioned whether tenants' practices result partly from the failure of building designers to include basic, low cost passive design features, such as eaves for sun shading, daylight access, and natural ventilation. A social-ecological perspective on housing design therefore offers potential to mediate the plurality of housing trends, types and tenures I have discussed throughout



this section. In the chapter's penultimate section to follow, I profile three design precedents which exemplify such social-ecological imperatives.

## 2.4 Guiding lights: Three ecological design precedents

As introduced in Section 2.0, design precedents – or built artefacts – represent influential 'texts' in design discourse and design education due to the knowledge and ideological positions encoded within them. For this study, I signalled the role of precedents as departure points for further design exploration, rather than archetypes. This section is dedicated to profiling three precedents that exemplify transferable social-ecological design knowledge, particularly in relation to the integration of food, housing and social space. I also connect the precedents, as outcomes of design practice, to key themes discussed to date in the thesis in reflection of my aim to transfer this study's outcomes to practice. In 'reading' these buildings as texts, I therefore highlight strategies for enhancing regenerative and adaptive capacity, the emergent building types, participatory design processes and 'design as pedagogy' (Orr, 2002).

The first precedent, located in Montreal, Canada and built in 2009, comprises a purpose-built, multi-dwelling example of productive housing, in which private and communal spatial and material norms are somewhat challenged.

The second, located in Berkeley, California, is a detached Victorian house, adapted into the 'Integral Urban House' in the 1970s in parallel with the budding environmental movement. The adaptation treated the entire site as a maximally regenerative system, within which the house and householders catalysed essential, cyclic processes.

The third precedent is located in northern, regional Sweden and takes the form of a multi-use commercial and community centre, built by a local co-operative using participatory approaches between 1998 and 2000. I have included this multi-use example for the potential of its nascent type to complement current developments in urban agriculture, and help compensate for the poor liveability of much new higher density urban housing. While the first and third precedents

are located in climates more extreme than any Australian climate zone, I identify principles and considerations from each that are transferable to the Australian context.

## Maison Productive House, Montreal, Canada

**Designed by:** Produktif Studio De Design and Design 1 Habitat, 2009

**Type:** Multi-dwelling residential and mixed use (bakery, office/workshop tenancies); inner urban re-use and new construction

**Tenure:** Owner-occupied and rental



Figure 2.1: The multi-level townhouses of Maison Productive House and food growing spaces

### **Ecological design approaches:**

- Passive solar siting and orientation, active solar, and geothermal heating
- Smaller apartment areas with multiple levels to maximise solar gain
- Zero emission target, excess bakery and sauna heat is re-cycled to greenhouse
- Zoned production spaces, using building to create a microclimate
- Greenhouse, seasonal open air growing spaces, composting, water harvesting, grey water recycling
- Communal facilities (30 per cent of total area) to reduce replicated private facilities, for example, laundry, recreation space, sauna, car-share
- Combination of managed communal, and private growing spaces (Gorgolewski, Komisar & Nasr, 2011, pp. 126-131).

Box 2.1: Precedent 1 – Maison Productive House, Montreal, Canada

## Precedent 1: Maison Productive House

As an amalgam of re-use and new construction, the Maison Productive House highlights building types as potentially temporal and less fixed. This is in part due to its mixed-use configuration, and the less determined nature of some spaces. Its design also engages with the social sustainability concerns of its encircling neighbourhood, by incorporating, for example, a car-share scheme and a bakery space to supply fresh bread and support employment. In addition to the ecological design concerns and diverse food production methods, the design of the Maison Productive House is particularly instructive for the way it addresses tensions between private and communal space, acknowledging that cultural norms are challenged in the process. The preference for a private washing machine by some residents, for example, over the communal laundry is highly relevant in Australia where domestic autonomy and private space are typically prized (Gaynor, 2006).

This highlights the need for careful consideration of cultural practices in designing private/communal facilities and boundaries. The important role of dematerialised design, in the form of a non-profit organisation, and its systems for managing the communal spaces and food production, is also noteworthy. The limitations posed by the strata title framework in Australia might well be redressed in the future with alternative models of this kind in order for communal, ecological infrastructure to effectively function.

## The Integral Urban House, Berkeley, California

**Designed by:** Helga and Bill Olkowski, Tom Javits and the Farallones Institute, 1970-80s

**Type:** Detached urban house

**Tenure:** Owner-occupied



Figure 2.2: Rear view of the Integral Urban House showing greenhouse, solar collectors and productive garden

### Ecological design approaches:

- Integrates three major functions: food production, resource recycling, and energy and resource generation
- The three functional systems seek to be as closed loop as possible for continuous energy, water and nutrient cycling
- Systems and technologies are as simple as possible to enable mainstream adoption
- House is adapted with passive solar features including a greenhouse, bathroom window heat sink, cool store and pantry
- Diverse food production including vegetables, fruit, small livestock, bees and aquaculture, maximising horizontal and vertical space, and the street verge (Olkowski, *et al.*, (2008 [1979], pp. 24-41).

Box 2.2: Precedent 2 – The Integral Urban House, Berkeley, California

## Precedent 2: The Integral Urban House

After serving as a demonstration, adaptive re-use project in the 1970s and 1980s, the Integral Urban House has reverted to a private residence. My focus for this precedent spans the period when the house operated as an educational site for the Farallones Institute, whose members showcased its adaptive design to teach about the house and site as integrated, regenerative systems. These systems resulted from consultative design processes and trials, merging interdisciplinary expertise within a collaborative design team including the live-in Institute staff. The designers wished to make the systems and energy, water and nutrient cycling processes achievable for other householders, writing that they saw the householder as “an active and intelligent participant in managing, maintaining and adapting the dwelling” (Olkowski *et al.*, (2008 [1979], p. 35).

While the house no longer serves as a demonstration project, recent republishing of this documented phase underscores its persistent relevance. This precedent signals how householder-driven adaptive design, opened up for wider engagement, could underpin the development of ecological literacy at the scale of the home and community. In combination with the documented, technical rationale for the ecological design approach, the Integral Urban House has become an exemplar of the ‘design as pedagogy’ perspective that David Orr (2002) urged for design practice. There remains ample scope for continuing to leverage such authentic models, formally and informally, as I propose in Chapter 7.

*Kretsloppshuset*, Mörsil, Sweden (Trans. 'The Circle of Life House')

**Designed by:** A collective of co-operative members and local trades- and craftspeople, 1998-2000

**Type:** Multi-use commercial (café, shop, meeting space, henhouse) and communal gardens

**Tenure:** Combined part-ownership and co-operative



Figure 2.3: South-facing greenhouse, café space and garden of *Kretsloppshuset*

**Ecological design approaches:**

- Building serves as a systems hub for its indoor and outdoor functions and seeks to overtly express its cycling approaches
- Greenhouse for solar gain and to lengthen growing season, housing both café and food production
- Café and shop offer foods preserved on-site, and other local produce
- Internal chicken house cycles garden and kitchen waste, provides eggs and manure for garden, and generates heat
- Materials and fittings are renewable and recycled using benign, traditional finishes (*Kretsloppshuset*, n.d.).

### Precedent 3: *Kretsloppshuset* (The Circle of Life House)

Situated in a small township in regional, northern Sweden, *Kretsloppshuset* is an important community hub, providing infrastructure for education, meetings and events. Food production is a major activity during the summer, with the café and shop promoting local foods year-round. It exemplifies a nascent building type resulting from the vision and ecological values of a grassroots community group, and an immense participatory and voluntary effort. The vernacular construction, internal fittings and furniture employ traditional materials and crafts, which enabled contributions from many local groups and individuals who possessed, or wished to learn, craft skills. Also incorporating programs for people with learning disabilities, the facility's model balances commercial operation with services to the community – a highly transferable principle. As noted in the introduction to this section, community-generated infrastructure of this kind could help to offset the poor amenity of much higher density housing, with potential health and well-being benefits for residents arising from food-producing activities. In a further example of Orr's (2002) 'design as pedagogy', *Kretsloppshuset* also expresses its regenerative systems and cycling functions in order to develop the ecological literacy of its visitors.

Viewing the three precedents collectively, they convey a site-wide commitment to achieving regenerative capacity, in tandem with providing high amenity for householders and visitors. The Maison Productive House and *Kretsloppshuset* projects were beset with many challenges, including securing financial backing and suitable ongoing management, underscoring how ecological design driven by visionary values must often subvert market orthodoxies and carve new, responsive operating models. The precedents also underscore how the food producing functions actually help catalyse energy and waste cycling for the entire household or enterprise. Social-ecological design practice in these three diverse cases has realised multi-use, integrated building types and productive spaces as joyful places for people to live in and use. More broadly, this exploration of precedents foreshadows my approach to interpreting the outcomes of design in Section 3.4, and devising an analysis of relevant material culture in Section 4.3.



## 2.5 Conclusion

This literature review, coupled with the background provided by Chapter 1, has illuminated that the contemporary provision of food and housing connects every dwelling, every household, and every meal with systems reverberating far into the biosphere. It has also underscored that in order for social-ecological design to mediate the dominant, ecologically degrading practices that have become embedded within food space and housing types, the practices themselves need to be scrutinised. Correspondingly, the practices bound within alternative, counter-movements in food and housing, and their emergent spatial-material manifestations present instructive sites for exploration. Normalised demarcations between internal, external, private and communal spaces and their functions become particularly dynamic sites of inquiry when food production, energy, water and nutrient cycling, biodiversity and social sustainability are seized as design priorities. This study is positioned to contribute further to what I have established as a richly interdisciplinary field, by elucidating regenerative food producing practices, knowledge and know-how that could in turn co-determine emergent housing types.

Through the review I have mapped two key contextual domains informing the research design, which I detail in Chapter 4. The first domain concerns the shifts toward urban consolidation, higher density housing, and rental tenure in Australia's rapidly growing cities, all of which present design challenges for urban agriculture and social-ecological housing. The second domain positions the existing, vast suburban housing tracts as an immense resource. This is due to their latent productive land, their scope for ecological restoration, and for the agency that might be exercised by a still substantial proportion of owner-occupiers living there. Potential interchanges and synergies between these two contextual domains inform the research design in Chapter 4, and emerge as opportunities for design research for resilience. The literature from which I have derived these contexts has also provided core analytical tools – the food axis, material culture dynamics and design as pedagogy – that I apply in Chapters 5, 6 and 7. These also serve as conceptual tools interwoven into the design research methodology of the study, which I articulate next in Chapter 3.



## Approaching design research

### 3.0 Introduction

The three questions core to my inquiry give form to the study, its logic and its purpose in generating new knowledge of utility to ecological design practice and education, and building urban resilience. As stated in Chapter 1, these are:

1. What are the significant connections between food and housing, relative to changing social and ecological conditions over time?
2. How do the practices of ecologically literate, home-based food production fit with dominant housing typologies, and particularly their kitchens and gardens?
3. How can design research propose alternative, regenerative kitchen-garden systems as an urban resilience strategy?

Reflected in these questions is the study's alignment with ecological design and resilience agendas. Through first examining the processes and products of design as a hybrid knowledge domain and my interpretation of this reality in Section 3.1, I position design in the study. I then locate design research in relation to dominant research traditions in Section 3.2, aligning this study with interpretive and generative knowledge-making approaches. In Section 3.3, I articulate my approach to design research by defining 'design research for resilience'. Through subsequent discussion of ways of knowing and representing knowledge in Section 3.4, I propose my own practice-centred

methodology, drawing on the work of John Dewey (1930, 1938; with Bentley, 1949) and Donald Schön (1983) in relation to knowledge-making within experience, action and reflection. I draw on Nigel Cross' (2006) identification of distributed sites of design knowledge in people, processes, products, and connect Pierre Bourdieu's (1977, 1990) concept of the *habitus* to ecologically degrading practices and types. Guided by Tony Fry's (2009) interpretation of Bourdieu, I discuss the pre-figuring role of design and the potential to re-vision types and practices through design. I also draw on the participatory design work of Liam Bannon and Pelle Ehn (2013) to conceive ways of co-generating resilience strategies with study participants.

Accounting for my own role, I make aspects of my background and experience explicit in Section 3.5, including the role of my home as a 'living lab' in the study. Issues of ethics and my commitment to Steinar Kvale's (1995) re-conception of validity are discussed, and in closing the chapter in Section 3.6, I describe further reflexive tools I have adopted in relation to writing.

Given the multi-disciplinary span of design research and its relative emergent status among research traditions, this chapter illuminates design research as research *into*, *for* and *through* design, in the service of a broad resilience agenda. With the aim of advancing design research for resilience, I detail how it was carried out in this study in Chapter 4, moving from the general to the specific, three-phase research design. In tandem, Chapter 4 represents a partial response to the third research question above, by demonstrating *how* design research can propose urban resilience strategies. The contingent interrelation of foundational concepts for inquiry, introduced in Section 1.4 as resilience concepts, practice theories, questions of type and participatory design, bridges this chapter with Chapter 4 to follow.

### 3.1 Design processes, design products and design in this study

In setting out my approach to design research in this chapter, I first make some key observations about design understood as a hybrid knowledge domain and a set of practices, from which design research has emerged formally over recent decades. The three design research perspectives introduced in Chapter 1 – research *into*, *for* and *through* design, ventured by Frayling (1993) – demonstrate their relevance to this study based on these initial observations. Across theoretical discussions of design and research is acknowledgement of the problematic relationship of each to the other (for example, Cross, 2006; Downton, 2003; Fraser, 2013a; Groat & Wang, 2002; Krippendorff, 2007; Rust, 2004). The crux of the dilemma according to design scholar, Chris Rust, is that ‘invention’ is a central principle in design, while in scientific research invention “is perhaps not compatible with the dispassionate relationship with knowledge that scientists have traditionally claimed” (2004, p. 76). Design as a process is conjectural and generative of future conceptual, material and perceptual states, in architectural scholar David Wang’s (2002) related characterisation. The outcomes of design processes, therefore, are assessable “on a better/worse continuum, not the true/false one that science aspires to”, as observed by architectural scholar Peter Downton (2003, p. 11). The conjectural nature of design process has implications for its subject matters, and the problems and questions with which design researchers grapple when design is practised as inquiry, research *through* design.

The products and outcomes of design processes – objects, environments, systems, interfaces, communications, services – can be viewed as integrating and embedding knowledge and expertise from across a broad array of knowledge domains. In his foundational writing on design methods, John Chris Jones identified a tripartite hybridity of design blending aspects of art, science and mathematics, without foregrounding any one field as dominant (1992 [1970], p. 10). More recently, design theorist Wolfgang Jonas (2004) described the subject matter of design as a ‘hybrid swamp’ and design itself as an ‘interface discipline’. Jonas’ (2004) imagery suggests the way in which design processes actively intersect multiple knowledge domains. Consequently, the

problems and questions driving design processes largely determine the subject matters of design practice and design research in given contexts.

The problems defined and addressed within design processes are distinctively *indeterminate* as design scholar Richard Buchanan (1992) pinpointed.

Buchanan also described design problems as ‘wicked’ in character, evoking the ‘wicked problems’ coined by Horst Rittel and Melvin Webber (1973) in relation to planning and governing. Ontologically, Buchanan underscores the *lived* experience of being a designer, or design researcher. Contemporary design practice and design research are characterised by ‘wickedness’, presented by the need to mediate human needs, behaviour and cognition, practices, competing stakeholder interests, regulatory frameworks, and technical affordances and constraints. In professional practice, design problems are posed by third parties, are thus partially defined, and therefore subject to redefinition over the course of a design process. In conducting design as inquiry – whether as research *into*, *for* or *through* design – the questions are defined and redefined by the design researcher, as my three research questions reflect. Design studies scholar Nigel Cross stated design is “a process of pattern synthesis, rather than pattern recognition. The solution is not simply lying there among the data ... it has to be actively constructed by the designer’s own efforts” (2006, p. 8). New design knowledge, as I elaborate in Sections 3.3 and 3.4, arises from these iterative cycles of question definition, active construction, representation and reflection within the processes of design.

Processes of design also occur routinely outside of professional practice as a constituent of everyday human experience (for example, Cross, 2006; Dormer, 1994; Ingold, 2013), widening the scope of potential design knowledge. Since antiquity, humans have designed their own artefacts, environments and initiated related practices, signalling the relevance of research *into* and *for* design.

Studies of culture-specific craft traditions and material culture reveal design as an everyday practice that was for thousands of years inseparable from craft making; an observation informing the ways of knowing I identify in Section 3.4. The transformations wrought by industrialism and mass production, as traced by design and communication scholar Klaus Krippendorff (2006), ruptured these conjoined practices of design and craft, and instated the subservience of

professionalised design to industrial processes and material consumption. The contemporary subservience of design practice to a dominant, production-consumption agenda is one of three contrasting agendas I subsequently discuss, in order to align this study with ecological design and resilience agendas.

### Intentionality: Who and what does design serve?

Recognising the power conferred through the outcomes of design, I differentiate the primary agendas served by design practice and design research in this section. The potential momentum of design is summed up in designer and scholar Tony Fry's comment that "everything designed goes on designing" (2009, p. 30). Types and typologies are products of design, as I introduced in Chapter 1, and exemplify how design perpetuates particular practices and norms, many of which are ecologically degrading, or 'defuturing', as Fry (2009) argued. Broadly, I discern three agendas served by design practice, and design research by extension. These comprise production-consumption imperatives, ethical and ecological imperatives, and design thinking, or the application of design to add value (of different kinds) to other fields. This range of imperatives highlights that the 'intentionality' involved in all design, as discussed by Simonsen, Bærenholdt, Scheuer and Büscher (2010, p. 203), is directed to serving various interests.

The first agenda primarily serves the global expansion of design for production-consumption with a particular emphasis on industrial and consumer technological goods and services, increasingly supported by low-cost labour in recently industrialised nations. Interaction and interface design, for example, have come to rapid prominence in this context as daily life and commerce is increasingly mediated by technology. Echoing designer Victor Papanek's (1984, 1995) trenchant criticisms of design in the service of needless consumption above human needs, Fry (2009, 2011) sees the majority of design practice still directed to this end. The design of 'green' counterpart products, introduced in Chapter 2 and critiqued in relation to the kitchen in Chapter 5, also serves this agenda.

The second broad agenda, with which I align this study, builds upon established ethical, social and ecological design imperatives such as those propounded by Papanek (1984, 1995), Pelle Ehn (1988), and McDonough and Braungart (2002, 2013), manifesting variously in culturally-aware, accessible and participatory design practices. Latterly, design in the service of social, political and ecological agendas has come to define design activism, which Julier (2011) points out has a long historical pedigree when design is understood as a form of contestation. In his definition of design activism, Alistair Fuad-Luke (2009) emphasises the role of design in creating a counter-narrative to dominant conditions. Dematerialised forms of design play a vital role in the creation of such counter-narratives, with Julier (2008, 2011) noting the role of designers and other creative professionals in structuring information with the aim of producing new or altered cultural activity. Similarly, architectural scholars Jeremy Till and Tatjana Schneider (2012) propose design as the exercise of ‘invisible agency’. Their case studies, serving environmental and social justice agendas, include problem redefinition, reconfigured systems, and making visible existing spatial resources in the community via online tools.

In the third broad agenda, design practice diffuses and permeates fields such as business management, logistics, information technology and medicine. To this end, design practice offers integrative ‘design thinking’, as expounded by Buchanan (1992) and recently elaborated by design scholar Kees Dorst (2011). This includes processes of analysis, knowledge integration and optimisation in resolving open, complex problems and generating business opportunity. Service design is a related and growing field involving “the activity of planning and organizing people, infrastructure, communication and material components of a service in order to improve its quality and the interaction between service provider and customers” (Service Design Network, 2014). The inclusion of communication in this definition highlights too the flourishing field of communication design. It can be deployed to serve any of the three agendas, arguably along with service design and design thinking itself.

In the discussion above I have focused on forms of design practice and the broad agendas they serve – the directional nature of design observed by Fry (2009) – staking too the social-ecological imperatives served by this study.



Design research can be similarly directed to align with, challenge or bridge the broad agendas above. A further factor is whether design research is conducted inside or outside the academy, the scope of both made evident in the approaches documented by Simonsen, Bærenholdt, Büscher, and Scheuer (2010). In conducting this design research within a publicly funded institution identifying 'environment and sustainability' among its research priorities, the alignment of this study is further strengthened. Building on these observations of the hybridity of design knowledge, and the indeterminate problems and intentionality of design processes, I next position the study in relation to the housing and food systems context I established in Chapters 1 and 2.

### Positioning design in this study

In this section, I set out my four positioning statements regarding design processes and their outcomes that determine my orientation to design research, each followed with a supporting rationale. The statements arise from a synthesis of the problem framing, theory and concepts discussed in Chapters 1 and 2. Along with the research questions set out in Section 3.0, these positions contribute to the research design detailed in Chapter 4.

#### **1. Design research that seeks to integrate housing with regenerative food systems needs to question how relevant outcomes of design are persisting, and the nature of their relationship with current, and anticipated social conditions.**

The outcomes of design are potentially replicable, boundless in their reach and persistent over time. Materialised products of design such as urban form, housing types and the food system, coupled with their dominant typologies and practices all reflect particular social and temporal conditions. Design's persistence renders it capable of reifying particular practices even when social-ecological imperatives have changed. Ostensibly, our urban form, housing and the food system reflect high capitalism and high modernity; an era in which perpetual growth was assumed, energy and resources were cheap and plentiful, and technology was deemed unassailable in its ability to redress problems.

**2. Given the role of design in initiating change, research *into, for and through* design should seek to intersect intentionally with other disciplines engaged in, and driven by social and ecological imperatives.**

Inside and outside professional practice, design is serving the converse role of change agent. In responding to ecological crisis, its agency is mobilised from different starting positions reflected in the contrasting aims of ecological efficiency, ecological design and positive development introduced in Chapter 1. Design's agency has limitations however, as McDonough stated in his eighth principle of design for sustainability: "[D]esign does not solve all problems. Those who create and plan should practice humility in the face of nature. Treat nature as a model and mentor, not as an inconvenience to be evaded or controlled" (1992, p. 6). This poses the need to engage actively with other social-ecological knowledge domains to extend the hybridity and relevance of design knowledge.

**3. Design research in the service of resilience is contingent upon engaging with ecologically literate participants at a range of scales, and offering feedback and collective insights to these stakeholders to support their own agency.**

The wider practice of design as a constituent human activity – 'everyday design' – is a vital exercise of human agency enacted, for example, in shaping and adapting domestic environments and community infrastructure. When such agency is mobilised as ecologically literate action, by householders in this case, there is a consolidation of thinking, doing and making distinct from the specialised tasks undertaken in the typical organisation of professional design practice. Bound within these commonplace acts can be individual and collective strategies for living more sustainably and developing resilience. Krippendorff urged designers "to inquire into the conceptual abilities of diverse stakeholders through processes of exchanging narratives with them about possible futures" (2007, p. 7).

**4. Design research needs to identify, and engage not only with diverse knowledge domains, but their forms of knowledge representation, exploring representation integral to inquiry.**

Professional knowledge domains, including design, are becoming more permeable, fluid and even ephemeral as technological advances hasten the redundancy of some fields and practices. There is continuity however, in humanity's need to be housed and fed in the face of such technological flux and deepening uncertainty around biospheric conditions and resource depletion. Alternative, speculative ways of achieving these basic human needs are needed, with the requisite knowledge dispersed across a spectrum of stakeholders, and sanctioned and popular sources. Foreshadowing my discussion of knowledge representation in Section 3.4, future alternatives can be generated through partially resolved and more fully resolved representations, for example, patterns, models, practices, discourses and materialised artefacts. These knowledge artefacts point to the potential outcomes of research *through* design. This view is consistent with a broadened, networked approach to architecture and design, termed 'spatial agency' by Nishat Awan, Tatjana Schneider and Jeremy Till (2011). In their conception, the primacy of highly determined built forms, and their veneration through intra-profession discourse, is challenged by wider forms of participation and representation across spatial fields.

These four positioning statements span the persistence of the outcomes of design relative to social-ecological conditions; the role of design as change agent; a value for engaging ecologically literate participants; and the necessity to integrate diverse knowledge domains and forms of representation. Collectively, the statements convey my commitment to conducting research *into, for* and *through* design as 'design research for resilience', defined more fully in Section 3.3. In the next section, I develop the study's epistemological foundations further by locating design research in relation to the dominant research traditions.

## 3.2 Locating design research

Design and research have been considered problematic in relation to one another, as I suggested in Section 3.1, based on the development of theories since the 1960s. Design research has emerged relatively recently from conditions demanding it conform to the scientific tradition in order to be legitimised as research, but the debates have persisted and arguably remain relevant. Wang (2002) and Krippendorff (2007) both argued that the conjectural, generative nature of design is ontologically misaligned with the propositional nature of science. To Krippendorff, 'design research' is an oxymoron. Wang expressed his view of the logical difficulties with reference to the art-science divide:

[W]e can make a distinction between design as research, which we hold to be at best a difficult conceptual union of all the mental faculties, and research *about* the design process. The former seeks to subsume a reality that is inherently nonpropositional (generative design as a mode of art production) under the domain of a propositional activity (analytical research) (2002, p. 389).

These arguments suggest 'research' is limited to propositional activities associated with the positivist, scientific research tradition; alternative perspectives of research as human-generated knowledge-making were not entertained. Studies into the practices of science, however, such as those of Bruno Latour and Steve Woolgar (1979) and Latour (1999, 2004), have contributed to scientific inquiry and design processes being regarded as more alike. Applying Michael Polanyi's (1958) concept of 'illumination', Rust questioned whether scientists, like designers, depend upon an implicit 'leap' that bridges the gap between existing knowledge, deciding what to investigate or trial and a subsequent innovation (2004, p. 77). Balancing his argument that design is incompatible with research, Krippendorff sought to expose the fallibility of science itself, suggesting the need for "a less delusionary epistemology for scientific inquiry" (2007, p. 8).

In recognition of these challenges to the scientific tradition, I locate design research, in this section, among generative approaches to knowledge-making that are subjective and interpretive in their apprehension of reality and its representation. I also employ Frayling's (1993) three perspectives – research *into*, *for* and *through* design – to demonstrate the interplay of research traditions in design research, and how they inform my epistemological standpoint.

The key assumptions on which this study rests are conceived in line with those distinguishing features of interpretive approaches identified by Louis Cohen, Lawrence Manion and Keith Morrison (2000, pp. 21-22). These positions are in turn founded on Peter Berger and Thomas Luckmann's *Social Construction of Reality* (1966) in which the case was made for concurrent objective and subjective realities in sociological inquiry. I therefore regard people as active in the construction of their own reality, with multiple representations of reality co-generating the social world. Further, reality is temporally fluid, often contested, and constantly arising out of interactions between humans and non-humans, to borrow Latour's (1999) dichotomy. I accept that the practices arising out of routine interactions can be sufficiently collective to warrant interpretive claims of understanding beyond entirely idiographic cases. Further, all such new knowledge is mediated by researcher subjectivities, the social context in which the research is conducted, and the subsequent means of knowledge representation, most commonly limited to language and text.

Moving beyond the common duality pitching positivist approaches against interpretive approaches, as urged by Steinar Kvale (1996), I view the dominant research traditions as interacting in design practice and research. The three perspectives proposed by Frayling (1993) – research *into*, *for* and *through* design offer a frame for viewing design research as an amalgam of research traditions and epistemological standpoints, foreshadowed in my discussion of hybridity in Section 3.1. The resultant knowledge claims become integrated and contextualised as new design knowledge through application (Buchanan, 2001). Research *into* design, including the history, processes and methods of design, is exemplified through the works of Buchanan (1992, 2001), Cross (2006), Jones (1992 [1970]), Krippendorff (2006, 2007), and Rust (2004).

Research *for* design, in contrast, is evident in the scientific research feeding into architectural design. This has achieved, for example, the crucial structural-mechanical, thermal performance, and materials' toxicity knowledge upon which safe, habitable buildings are contingent. Research emanating from the behavioural and cognitive sciences has also been contextualised as design knowledge. This is demonstrated by the Environment Behaviour Studies work of Rapoport (for example, 1969, 1977, 2000), and John Zeisel's (2006) related application of neuroscience to architectural programming. Similarly, approaches derived from the arts, humanities, and social sciences are appropriated in research *for* design. The approaches and insights reported by architectural scholar Linda Groat (2002), for example, enable novice designers to better understand the affective, symbolic, cross-cultural, and therefore deeply subjective nature of their work. In a further example, anthropologist Tim Plowman (2003) highlighted how anthropological approaches, namely ethnography, might serve a more critical, humanised design practice.

This diversity of contemporary approaches to design research, and the contrasting ontological bases they reflect, is foregrounded in housing researcher Lindsay Asquith's point that the 'measures' – or methods – are best determined by the questions core to the research (2006, p. 138). My discussion to this point has framed design research as constituting various forms of inquiry *into* and *for* design. In having adopted all three of Frayling's (1993) perspectives in this study, driven by my research questions, I next focus on research *through* design, in which design process is core to inquiry. That design, and other creative practices, can now be constituted as a form of inquiry in their own right has gained scholarly acceptance and recognition relatively recently (Downton, 2003; Franz, 2000, 2007; Fraser, 2013b; Frayling, 1993, 2011; Mottram, 2009; Smith & Dean, 2009).

The premise now increasingly accepted within the academy is that new knowledge can be generated *through* the exploratory, speculative, critically reflective and iterative processes of creative practice. Accordingly, knowledge-making and representation are not limited to textual forms but may be image-based, materialised, and embodied, though still subject to exegetical, or accompanying textual theorisation, as highlighted by practice-based

researchers Peter Downton (2003), and Hazel Smith and Roger Dean (2009). In Australia, examples include those of design scholar, Jill Franz (2000), who proposed an interpretive framework for practice-based research in design, and Helen Armstrong (2000), who progressed 'design-as-research' in graduate landscape architecture studios. Franz (2007) later employed what she termed 'arts-based inquiry' within graduate design education using image-based representation. Fellow Australian, Peter Downton (2003), addressed the issue of how such research is to be evaluated in architecture, formalising for example, the roles of critical reflection by the researcher and international peer review panels.

The research *through* design approaches of Franz, Armstrong and Downton cited above, highlight that their respective interpretive frameworks were devised integral to conceiving of, and conducting design research, drawing on contrasting epistemological positions. In this section I have located my approach to design research among these generative, interpretive approaches. Research *through* design also needs to be understood as a process of practice-based research, the mainstays of which are complexity and emergence, according to Brad Haseman and Daniel Mafe (2009). Elaborating, they describe shifting problem definitions, the need to mediate emerging critical contexts, and to grapple reflexively with representation. In this, I identify with those who Haseman and Mafe identified as attempting "to build epistemologies of practice which serve to improve both the practice itself and our theoretical understandings of that practice" (2009, p. 214).

In Sections 3.3 and 3.4, I articulate my epistemological position with reference to theory, by first defining 'design research for resilience', and then connecting sites of new design knowledge, and its representation, to ways of knowing.

### 3.3 Defining 'design research for resilience'

I have argued from the outset, and signalled in the title of this thesis, that design practice and design research should be directed to generating resilience strategies in response to global ecological status. In this section, I foreground aspects of design research, as characterised in the previous section,

compatible with those defining features of resilience inquiry conducted by members of the international Resilience Alliance (for example, Walker & Salt, 2006), and including the Stockholm Resilience Centre (Moberg & Hauge Simonsen, 2011; Hauge Simonsen *et al.*, 2014). These synergies were foreshadowed in the foundational concepts of Section 1.4, emphasised here as the active intersection of multiple knowledge domains and forms, and interdisciplinary research drawing on diverse epistemologies and research approaches. The connection of spatial and temporal scales, and building adaptive capacity through informed speculation about future biospheric and social conditions are also addressed.

The social-ecological perspective core to resilience inquiry, as the term suggests, conjoins the social and ecological from a systems perspective. Disciplinary demarcations are subsumed therefore by the potential for knowledge domains – whether scientific, humanist, popular or indigenous – to be integrated and hybridised through inquiry, to build resilience and pursue ecological restoration. Research approaches in turn, need to fit-to-purpose in response to problem definition. Applied to design research, this is highly compatible with Jonas' (2004) depiction of design as an 'interface discipline', and Fry's (2009) view of design as an integrative meta-practice. The resilience concept of 'shadow networks' (Moberg & Hauge Simonsen, 2011) is also compatible, in the potential for design research to engage stakeholders from diverse settings for participation in generative, knowledge-making processes. A commitment to shadow networks can also help address issues of scale in design research. By engaging stakeholder participation at the scale of the home and neighbourhood, new, small-scale design knowledge can be connected with larger-scale ecological design knowledge, such as ecological urbanism (Mostafavi, 2010).

Resilience inquiry and design research also converge in their priority for speculating about, and generating alternative future scenarios. Among these are responses to disasters and catastrophes, and the speculative scenario planning emanating from climate change mitigation strategies. Fry's *Boonah Two* sustainable city project (2009, pp. 59-70) is a case in point. In resilience inquiry, alternative governance approaches are also explored to enhance



adaptive capacity. These are depicted as ‘polycentric’ in nature, involving multiple, interacting bodies (Hauge Simonsen *et al.*, 2014). In design research, this prompts consideration of dematerialised design – governance strategies, processes and structures – that are likely to be necessary in order to instate change through ecological design. Invoking Krippendorff’s (2006) discussion of the contemporary role for design in generating discourse, coupled with Fry’s (2011) call to re-direct design as a political practice, there opens within design research immense opportunity to help mobilise the resilience agenda through conjoining the defining features of their research approaches. In the following section, I detail the knowledge-making process I propose, in order to conduct design research for resilience, as defined above.

### 3.4 Ways of knowing and ways of representing knowledge

Having distinguished design research for resilience as an interdisciplinary, generative form of inquiry grappling with uncertainty, I share Smith and Dean’s view of knowledge in creative practice as “unstable, ambiguous and multidimensional” (2009, p. 3). These descriptors apply aptly to design knowledge, as I subsequently discuss. In this section, I emphasise three concepts ventured in the work of philosopher and educator, John Dewey, in the early twentieth century: knowing as a function of action and experience, knowledge as inquiry, and the relationship between theory and practice. I then identify potential sites for design knowledge-making, and close the section with a discussion of knowledge representation, including the significance of digital, networked technologies in popular knowledge generation and open access.

In association with pragmatic epistemologies, Dewey (1930, 1980 [1934], 1938) argued that knowing is a function of human action and experience, a standpoint he developed further with Arthur Bentley (Dewey & Bentley, 1949). Dewey and Bentley’s ‘transactional’ view of knowing treated “knowledge as itself inquiry – as a goal *within* inquiry, not as a terminus outside or beyond inquiry” (1949, p. 97). This view of knowledge resonates with anthropologist Tim Ingold’s contemporary ‘art of inquiry’, in which one’s relation with the world is a

responsive and experimental ‘correspondence’ (2013, pp. 6-7). ‘Inquiry’ in these senses spans everyday, creative practices, beyond inquiry understood as formal research. Interpreting Dewey’s view of knowledge, Liam Bannon and Pelle Ehn characterise inquiry as patterns of “framing situations, searching, experimenting and experiencing ... Experiments and learning-by-doing practices are fundamental” (2013, p. 46).

Taking issue with the entrenched bifurcation of theory and practice in the West, Dewey (1930) wrote at length on the significance of human action in knowing, arguing that it had been subjugated in the pursuit of certitude since antiquity. With particular relevance to the conjectural nature of design practice and design research discussed in Section 3.2, Dewey highlighted the ‘perilous’ nature of action due to its uncertainty of outcome (1930, pp. 23-27). In design research, ‘knowing’ is a function of the practices of inquiry, or action, in which uncertainty and ‘not knowing’ are made explicit through representation and reflexive strategies, both of which I subsequently discuss.

In contemporary discussions of the relationship between theory and practice, explanations appear to reinforce their separation on the one hand, and seek to bridge them as Dewey urged, on the other. The use of categories, such as ‘knowledge-how’ (practical, skills-based), ‘knowledge-that’ (factual or propositional), and ‘knowledge-of’ (acquaintance or awareness) by Downton (2003, p. 62) tends to reinforce the separation. While also employing knowledge categories, higher education scholar John Biggs (2003) offers conceptual bridging of theory and practice. ‘Declarative’ knowledge, or knowing about phenomena, and ‘procedural’ skills-based knowledge, are both subsumed by ‘conditional’ knowledge. All three – declarative, procedural and conditional – become integrated as ‘functioning’ knowledge (2003, p. 42).

These integrative knowledge categories usefully emphasise the *performative* enactment of knowledge, including the exercise of judgement in knowing why and when. To Ingold, knowledge arises out of “our practical and observational engagements with the beings and things around us” (2013, p. 6). Performativity therefore reflects embodied forms of knowing, which art theorist Peter Dormer (1994) foregrounded in discussing the enactment of design within craft making,

including home-based renovating and building projects. Invoking the potentially granular nature of embodied knowledge, sociologist Richard Sennett described “the thousand little everyday moves that add up in sum to a practice” (2008, p. 77). Together, these perspectives linking knowledge, action and practices highlight the multimodal nature of knowing, a point I develop below.

### Sites of design knowledge for inquiry

Focusing on the generation of design knowledge, Cross (2006) identified such knowledge as residing in people, processes and products. In referring to ‘sites’ of design knowledge, I intend these as foci for potential knowledge-making, rather than objectively accessible knowledge outside of myself. These foci extend far beyond design practice, which is only one site of design knowledge, as designer-theorist Ken Friedman (2003) pointed out. His earlier attempt to map interdisciplinary design knowledge via a taxonomy (Friedman, 2000, p. 11) revealed the extent of design knowledge that is likely to be ‘knowing about’ or declarative knowledge, on the part of design practitioners. Functioning knowledge is more limited and bound within the design process itself, rather than gained experientially in social contexts outside of design practice. This creates sites of ‘not knowing’ in design practice that systematic design research can help to redress, through means elaborated below.

Writing critically on design practice, and interpreting sociologist Pierre Bourdieu’s (1977) theories of practice and *habitus*, Fry describes the manner in which consciously applied knowledge and skill become embodied and concealed:

The proficient exercise of any practice actually depends on it becoming an ontology – it has to become part of the being of the person who employs it. ... They can engage the demands, problems, issues, possibilities and advancements of what they are doing without having to think about the act itself (2009, p. 19).

In this statement, Fry signals *practices* as further rich sites of potential knowing from the perspective of inquiry. Practice approaches to inquiry in the view of philosopher Theodore Schatzki, comprise two main types: those that develop

an account of practices in a particular field of activity, and those that treat practices as a site in which to study the subject matter of those practices (2001, p. 2). In this study, both approaches offer methodological opportunities. Sociologist Alan Warde explained practices as sets of understandings, procedures and engagements, which come into play through performances (2005, p. 134). By extension, I propose that co-engaging in the practices under study, with participants, offers a means of explicating as far as possible the nature of those understandings, procedures and engagements. My concern for 'interiorized' and embodied know-how derives from Polanyi's (1967) 'tacit knowing'. The tacit knowledge bound within practices has been foregrounded, for example, in studies of professional practice and workplaces by Schön (1983) and Ehn (1988) respectively. In Chapter 4, I interrelate these practice-related theories and the resilience inquiry concepts in Section 3.2, and articulate how they have been adopted within the research design.

Further sites of potential knowledge-making are revealed in a shift of focus from the practices of people, to the products of design; such products include material and visual culture, both vernacular and professionally conceived. Within artefacts and environments knowledge is embedded and encoded, noted in relation to the ecological design precedents in Section 2.4. The built environment reflects particular directions in expert knowledge, as sociologists Michael Emmison and Philip Smith highlighted, citing for example, developments in business management, healthcare, education and technology (2000, p. 158). These knowledge-driven and organisational changes manifest spatially and materially, observable in recent shifts to offices with individual and collaborative workspace options; flexible, technology-enabled classrooms and libraries; and healthcare settings integrating a range of specialisms. In this regard, design is performative; the built environment performs such expert knowledge and values, while simultaneously shaping the adoption of new knowledge and values. The built environment therefore embeds *and* disseminates expert knowledge in its building types, along with knowledge reflecting the temporal, dominant social norms as introduced in the foundational concepts of Chapter 1.

## Identifying ways of knowing

In order to introduce ways of knowing and sites of knowledge-making above, I refer to them using categories and delineations common in theories of knowledge generation and representation. In terms of the study's epistemological foundation however, I pose the stated research questions through a *relational* inquiry between multiple sites and modes of knowledge-making. My ways of knowing are derived therefore through relating three key forms of inquiry, as foreshadowed in Section 1.3. The first consists of systematic analysis of relevant material and visual culture using theoretical and experiential frames of reference. The second involves my performative co-engagement in the same practices as research participants, namely engaging in home-based food production and broader approaches to ecologically literate living. The final form of inquiry involves the engagement of participants, along with my own engagement, in ideation processes of ecological design, to generate speculative approaches to future domestic environments. These forms of inquiry direct the structure of the research design and methods detailed in Chapter 4, in an articulation of the conduct of design research for resilience.

These ways of knowing are achieved primarily through insights arising out of shared experience, their subsequent representation and the subjection of both to critical reflection and re-representation. Reflective practice, or the active re-examining and testing of knowledge in action, presents a means of eliciting knowledge bound within situations and held latent in experience. Organisational learning scholar, Donald Schön, articulated how reflective practice is core to an epistemology of practice, in which thought and action become dialogical as a “reflective conversation with the situation” (1983, p. 281). Schön's investigation of professional practice in several fields produced the distinction between highly dynamic, intuitive reflection-*in*-action, and *post-factum* reflection *on* action, described by Schön as ‘second-order reflection’ (1983, p. 282).

Conscious reflective practice is made routine in the conduct of design research, both within the immediacy of current inquiry, and iteratively over extended periods. Reflective practice is rendered critical through *reflexive* practice, similarly in-action and on-action, a tenet core to all creative, practice-based research (Smith & Dean, 2009). This involves habitually questioning the impact

of my presence and actions upon the inquiry, along with those of others. Through this process, knowledge-making proceeds with a greater awareness of the subjectivities resulting from my social and cultural background, gender, values, and beliefs (Mason, 2002; Pink, 2007). Approaches from reflexive anthropology, such as Victor Turner's (1979) early work on ritual drama, are particularly relevant. Applied to this study, my co-engagement in the practices of participants – of performing with them – offers a means of 'getting inside' their experience, albeit temporally, and looking back at my own contrasting practices, as reflection-on-action. My ethnographic representations then persist as prompts for invoking my embodied and sensory memories of those performances, and the subjectivities identified within them.

In combination with reflexive practice, the relational nature of this study is supported by its methods of data generation and analysis. Theory is conceived throughout as arising through *abductive* reasoning, considered 'native' to both design practice (Cross, 2006) and interpretive inquiry more broadly (Blaikie, 2000; Mason, 2002). Unlike the well-established deductive reasoning in which theory precedes empirical inquiry, and its inverse inductive reasoning in which theory is derived out of the data, abductive reasoning proceeds dialectically (Mason, 2002). In practice, this entails moving to and fro, perhaps cyclically, and if honest, serendipitously at times, between experience and reflection *vis-à-vis* theory, data generation through representation, analysis, further reflection and representation, and subsequent theory generation. The role of representation in knowledge-making is foreshadowed here, the forms and significance of which I outline below.

## Representation and knowledge-making

All formal knowledge claims are representations, overwhelmingly in the form of text and numbers, traceable to particular ontological and epistemological standpoints. As noted in Section 3.2, a view of scientific knowledge claims as inviolate has been questioned in recent decades (Krippendorff, 2007; Latour & Woolgar, 1979; Latour, 1999, 2004; Rust, 2004). During this flux, the issue of knowledge representation has particularly exercised researchers committed to interpretive approaches, in an effort to have their knowledge claims validated alongside those of science (Denzin & Lincoln, 2011). As a result, I view

knowledge representation as a factor relevant to all forms of inquiry. This is accentuated in creative, practice-based research in which knowledge claims are also made through non-textual and embodied forms (Smith & Dean, 2009). Making new design knowledge is therefore an unavoidable consequence of judgements about what to externalise and represent, through which modes, and my alignment with the ecological design and resilience agendas stated in Section 3.1.

This subjectivity positions representation as a further question within the study. It is *through* inquiry as sociologist Sarah Pink argued, that issues of representation are grappled with beyond merely “observable and recordable realities that may be translated into written notes and texts”, questioning too, “the right of the researcher to represent other people” (2007, p. 22). In accepting knowledge as multidimensional and multi-sited, I make two observations germane to the inquiry and its subsequent communicability and utility. The first is the *partial* nature of the sum of knowledge that is represented through formal and scholarly means. Second, knowledge that falls outside of the sanctioned canons is not assumed to be less valuable, especially to design research that seeks to facilitate targeted social and cultural practices under the aegis of an ecological design agenda.

In response, I seek to foster multiple representations by multiple actors, using a range of modes through the research design. The research questions then provide the basis for evaluating one representation over another. Further, the research design assembles, contrasts and connects participant representations, my own representations, and wider representations such as those of grassroots movements and groups, popular communications and of course, scholarly representation. These take textual, visual, artefactual and discursive forms aligned with those ways of knowing set out above. New knowledge becomes communicable through re-representation when, for example, I generate and summarise data, construct analyses, and prepare textual, visual and material artefacts to be reviewed by participants or via scholarly peer review processes.

## Knowledge and the rise of the 'crowd'

Noteworthy in my discussion of multiple forms and representations of knowledge, is the significance in the age of the Internet of the rise of the 'crowd'. I refer to the ability of digital technologies to support authorship and self-publication in multiple media, to facilitate crowd-sourced collaborative texts such as wikis and online fora, and for open access to scholarly knowledge, outside the control of its traditional gatekeepers. This historical shift away from the primacy of books and publishers as gatekeepers has been termed the 'late age of print' by cultural theorist, Ted Striphas (2009). In Striphas' account, control is now being exercised through, for example, the defence of digital rights and content distributed via proprietary technologies in the case of e-books. Open source and open access movements run counter to such controls, with the 'crowd' actively networking and knowledge-making online. Wikipedia is an iconic example, with its underpinning software Linux, described as a 'public craft' by Sennett (2008, p. 24). In a prominent case of the 'crowd' self-organising via social media, the 2008 'Eat the View' campaign led by Kitchen Gardeners International resulted in First Lady Michelle Obama establishing a kitchen garden on the White House lawn in the first months of her husband's presidency (Todd, 2011, pp. 297-300).

These sites of knowledge-making using the tools of social media are particularly relevant to this study, with Bannon and Ehn (2013) noting how social media mediate many offline practices. Cooking and homecrafts are readily observable, relevant examples. These mediated practices of interest for inquiry are in turn, represented richly and made accessible via social media. This scope of potential sites and forms of knowledge representation is now overwhelming, hybridising and mangling formal and popular knowledge representations. While opportune to this study, this phenomenon demands unprecedented critical and evaluative skills on the part of the researcher. The relational ways of knowing and knowledge-making I have identified in this section – through analysis of material and visual culture, engaging in the practices of study participants, and co-generating speculative design responses – all reflect this fluid knowledge terrain. Returning full circle to intentionality and values in design research, the focus now falls upon the researcher in the room: me.



### 3.5 The researcher in the room

In this section, I make aspects of my background and experience explicit as one of several reflexive strategies employed in the study. Reflexivity, as outlined in Section 3.4, serves to mediate the inevitable impact of my background, presence and actions on the inquiry. To this end, I introduce a key self-generated artefact – my home – and its interplay with the study, addressing too issues of ethics, validity and trustworthiness. Finally, I focus on the role of writing as a further mediating, reflexive strategy.

Reflecting on entering practice as a neophyte designer over two decades ago, my practice was constrained in the sense that my models and experiences were limited to the dominant types and social institutions that the built environments of Brisbane and Sydney then reflected. During a prolonged period of independent overseas work and travel, opportunities arose to gain embodied experience in a range of social and work contexts, such as health and aged care, hospitality and various organisations' workplaces. On returning to practice and reflecting on these rich experiences, I developed a strong orientation towards design that served social ends rather than short-term commercial gains. This orientation has since expanded to interrelated ecological and political concerns. When I relocated to Sweden in 1997, insufficient language skills prevented me from working in design practice. My English language skills were valued, and I was soon embedded within Swedish workplaces teaching professional communication (and learning Swedish). Unbeknown to me, this heralded a long-term shift to the education sector, with roles to follow teaching design and becoming active in the evolving field of educational design.

In the higher education setting, the *transferability* of my design knowledge and skills became evident, as design thinking personified. When applied to the dematerialised design of online learning environments, professional development programs, evaluation strategies, processes and communications, I have enacted design as the kind of reflective 'meta-practice' described by Fry (2009). Design is at the core of everything I do, whether in professional practice, community work, a renovation project, or in relation to the flavours and form of tonight's dinner. This consciousness lends strong support for Cross'

(2006) insistence on ‘designerly ways’ of thinking and being. Without a professional allegiance to a single design discipline any longer, I approach the study from outside professional practice, while maintaining links with its practitioners, products and discourses.



Figure 3.1: My house, a ‘living lab’ for the study

In parallel with this study, I embarked on the process of designing, and with a contractor, building a modest passive solar house on a small plot in southern Tasmania (Figure 3.1). Integral to the ecological design brief was a goal for the house to function as a system in support of food growing, harvesting, low energy cooking, preserving and storing food, all on a tight budget. Approximately one third of its compact, multi-function footprint serves this goal, and its productive house capabilities will depend upon further developing flows and systems for cycling waste and energy. I view the house as nascent theory materialised, and while comfortably habitable the design is sufficiently unresolved to allow the house to function as a ‘living lab’.

The ‘living lab’ is a valuable concept, along with approaches enabling ‘design-after-design’, drawn from the participatory design work of Erling Björgvinsson, Pelle Ehn and Per-Anders Hillgren (2012). This is a looser application of the Living Lab approach to user involvement now common in the design of technologies (Bannon & Ehn, 2013). The embodied experience of living in the house allows for my own reflection in- and on-action, as well as providing a full scale artefact with which to engage study participants and others who have

come to comprise the study's shadow network. In terms of type, the house is suited to a small household of one to three people, and requires more user involvement with energy and waste systems than would be considered the norm. The study's imperatives assist me however, in maintaining a reflexive orientation to the house, above the affective significance it might otherwise command as my home. I welcome its ability to provoke ongoing critique and ideation.

Scaling out from this 'living lab' is my parallel involvement in a local not-for-profit community group, Channel Living, with over four hundred members. Among its activities are a community-supported agriculture scheme, a whole food co-op, and a program of educational and social events. Having served as president for a term during this study, meetings took place in my house on occasion, resulting in the house becoming linked with community activities. In a modest way, the house has become a talking point 'on the grapevine', and people interested in ecological building design and downsizing have subsequently asked to view the house. While not intended as an overt model, it fulfils this role occasionally, and has prompted greater consideration of the role of authentic models in developing ecological literacy, as I expand upon in Chapter 7.

## Ethical issues

My desire to co-engage in the home-based practices of participants provoked ethical questions around privacy, relationships, boundaries, and the representation of participants and their homes. In attempting to cultivate the role of *peer* with study participants, for example, the formalities of informed consent took unquestionable precedence. I accepted respectfully that some participants were inclined to 'show and tell' within their home environment rather than allow me to 'muck in' and share in their hands-on practices. It was conveyed too, that gardens and kitchens had been made more presentable prior to my visit, underscoring the practical challenge of carrying out the 'naturalistic inquiry' expounded by Yvonna Lincoln and Ebon Guba (1985). I was also the recipient of gifts of seedlings, seeds and preserves, while thanking participants with my own gift of local honey at the conclusion of visits. These however, are all acts consistent with the practices in which fellow gardeners engage outside of the study. My concern to study practices rather than individuals, and my role as a

co-producer of food, provided the means to make judgments about what and what not to study, once granted access into participants' private domains.

### Validity re-framed: Trustworthiness and related concepts

Having characterised the generative knowledge-making of design research and this study's practice-centred and relational epistemology, it follows that the three positivist mainstays of research integrity – validity, reliability and generalisability – do not apply. Proposing the alternative concept of trustworthiness for interpretive studies, Lincoln and Guba discuss strategies for establishing credibility, dependability, confirmability and transferability (1985, p. 300). Arguing that validity is a social construction in the absence of an objective reality, Kvale (1995) reconceptualised validity in three key ways: as quality of craftsmanship [*sic*], as communication, and as action. New knowledge claims therefore acquire a practice emphasis through dialogue and application, both of which are feasible in the context of design research.

This is a departure from pursuing validity via triangulation – or the validity-seeking deployment of multiple theories, methods and representations within inquiry – that has predominated in interpretive studies (Mason, 2002). I concur with Mason's qualifying argument, however, that "different methods and data sources are likely to throw light onto different social or ontological phenomena or research questions" (2002, p. 190). In discussing each phase of the research design in Chapter 4, I expand upon strategies for trustworthiness, with particular attention to the craft of inquiry, critical dialogue and transferability.

### Writing for integrity

Building upon those aspects of my background and experience judged to be of subjective relevance to the study, I make explicit here reflexive strategies enacted in the process of writing, guided by Kvale's concept of communicative validity (1995, pp. 30-32). As a reader of this thesis, you are aware of it having emerged from iterative cycles of representation, critique and reflection over a prolonged period. Its textual form is particular, distinct from other academic texts, and it serves as the evidential manifestation of myriad processes and interactions otherwise rendered invisible in time and space. I have used this

iterative writing process to identify and redress, for example, unchallenged assumptions and 'blind spots' in my arguments, as far as possible.

In this textual representation, I have striven to be honest and accountable. Within it, the voices, ideas and arguments of others are attributed as far as possible and made distinguishable from my own, such that I take responsibility for, and own my contributions. In this process however, I have no doubt integrated concepts and terminology within my declarative and functioning knowledge such that some voices and sources become obscured. In response I have adopted the following mitigating strategies, two of which I raised for consideration in Chapter 1. Foremost, I use voice – first person or otherwise – to evaluate the claims emerging in the text. If I am the source of a claim, I adopt the first person, with some allowance for potential repetition. Similarly in the case of action, I question the origin of its agency, posing Helen Sword's figurative question, "who's kicking whom (or what)?" (2012, p. 49). I also review the text to detect any literary tropes that distance, or erase my voice through nominalising, or 'fixing', verbs as nouns, for example, or by assigning agency to where it cannot reside, such as in 'the research' or 'the analysis' (Mansvelt & Berg, 2010, pp. 335-336). The final two strategies are those stated in Section 1.6, relating to my choice of in-text referencing style and citation convention. Should my execution of these strategies be found wanting, my commitment to them has prompted active and constructive engagement with the ideas and arguments of others nonetheless, along with my own iterative representations.

### 3.6 Conclusion

In this chapter I have foregrounded the hybridity of design knowledge, with its origins in the domains of art, science, and mathematics, and now spanning innumerable fields. Design is seen to be functioning as an integrative meta-practice and interface discipline, to quote Fry (2009) and Jonas (2004) respectively, driven by the indeterminate questions of design practice and its intentionality. I also observed the manner with which design practice and design research serve particular agendas. Aligning this study with ecological design and resilience agendas, I defined my approach as design research for resilience, applying resilience inquiry priorities for distributed, interdisciplinary

knowledge, diverse stakeholder participation, and the generation of alternative, future scenarios to enhance adaptive capacity. An overlay of Frayling's (1993) distinctions between research *into*, *for* and *through* design offered lenses for viewing design research as interacting productively with a range of research traditions and approaches.

In relation to ways of knowing, I have drawn on Dewey's (1930, 1938; with Bentley, 1949) view of knowledge as generated within experience and the everyday inquiries of human action. Knowledge-making and ways of knowing, as I have shown, also manifest in artefacts and environments, through the inscription and encoding of their human progenitors. Viewing knowledge as multi-sited and multi-modal, Cross' (2006) sites of design knowledge – people, processes and products – emerge as being in relational interplay within the enactment of practices, captured by Warde (2005) as performative understandings, procedures and engagements. Following my positioning of design in this study, I articulated three key approaches for this inquiry: the analysis of relevant material and visual culture, co-engagement in the practices of participants, and engaging participants as co-designers to propose speculative alternatives to the *status quo*. These approaches also reflect the interrelation of foundational resilience concepts, practice theories, questions of type, and participatory design, which are specifically applied in Chapter 4.

Addressing the core role of reflexivity in design research and interpretive inquiry more broadly, I set out strategies to mediate the inevitable impact of my background, experience and actions upon the study's conduct and outcomes. In this process, I noted that I approach the study as a designer outside of professional design practice, the role of my home as a 'living lab', and my parallel involvement in a grassroots community group with concerns related to the study's subject matter. I signalled too ethical issues associated with being granted access to the homes of the study's participants in order to co-engage in their practices, along with my commitment to Lincoln and Guba's (1985) transferability, and Kvale's (1995) validity through communication and action. These guiding principles are further expressed through the research design in Chapter 4, and the analyses of Chapters 5 and 6. Directed by the research questions stated in Section 3.0, and the epistemological foundations I have

established above, I detail how design research for resilience was enacted in this study, in the next chapter.





## Conducting design research for resilience

### 4.0 Introduction

In this chapter, I translate my approach to design research – design research for resilience – into the actionable research design I conducted during 2011 to 2013. The research design resulted from interrelating synergistic aspects of resilience inquiry, practice theories, questions of type, and participatory design. The resultant opportunities for inquiry were signalled in Section 1.4, and include distributed, interdisciplinary knowledge forms; a concern for connecting spatial and temporal scales; participation by diverse stakeholders; and the generation of alternative, future scenarios that pursue ecological restoration and build adaptive capacity. In detailing how I devised and enacted the research design as design research for resilience, I venture here a partial response to the third research question, by articulating *how* design research can propose urban resilience strategies. The strategies, in turn, emerged from the enactment of the three-phase research design and are set out in Chapters 6, 7 and 8.

I first outline the three overlapping phases of the research design, conceived as research *into*, *for* and *through* design, in Section 4.1. I interrelate resilience concepts, practice theories, types, and participatory design in Section 4.2, establishing the theoretical basis of the research design. In Section 4.3, I detail Phase 1 of the study, comprising a social-ecological analysis of dominant food culture and domestic design. Phase 2, involving a multi-household ethnography in 12 food growing settings, is detailed in Section 4.4, with the Phase 3 participatory design workshops and design iterations following in Section 4.5.

I explain each of the three phases of the study in terms of its purpose in the service of a resilience agenda, rationale, theoretical framework, forms of data and analytical approach. Through these accounts I establish the linkages between the methods, aided by the willingness of a subset of Phase 2 household ethnography participants to proceed into Phase 3, leading to the integrative final design phase. Drawing on the theory of practice-based research, I outline the process of designing a means of articulating and representing new design knowledge. This process was aided by the conceptual merger of the pattern language schema of Alexander, Ishikawa and Silverstein (1977), and the food axis of Collins Cromley (2010), as introduced in Chapters 1 and 2, and extended in Chapter 7. In applying these conceptual tools, my emphasis shifts to spatially mapping and representing both current and speculative food axes, in pursuit of the targeted practices of food provisioning, storing, cooking and eating captured within them. Throughout the chapter, I interleave specific strategies adopted in pursuit of trustworthiness and transferability, including Kvale's (1995) communicative validity. I also address transferability extending beyond thesis submission, signalling a need to engage the design practitioner community for genuine transfer of new knowledge.

## 4.1 Research design overview

The study was conducted over three overlapping phases, indicated in Figure 4.1, directed by the research questions stated in Section 3.0, and shaped by the approach – design research for resilience – established in Chapter 3. Phase 1 – research *into* design – involved a social-ecological analysis of dominant visual and material culture centred on cooking, food culture, and the kitchen integral to domestic design. This led into Phase 2, involving ethnographic participation in 12 domestic food growing settings, reflecting research *for* design. Phases 1 and 2 extended into Phase 3 – research *through* design – comprising a series of participatory design workshops with individuals actively pursuing sustainable food producing activities at the scale of the home, some of whom also participated in Phase 2. Phase 3 also involved my own design iterations in the latter stage of the study.

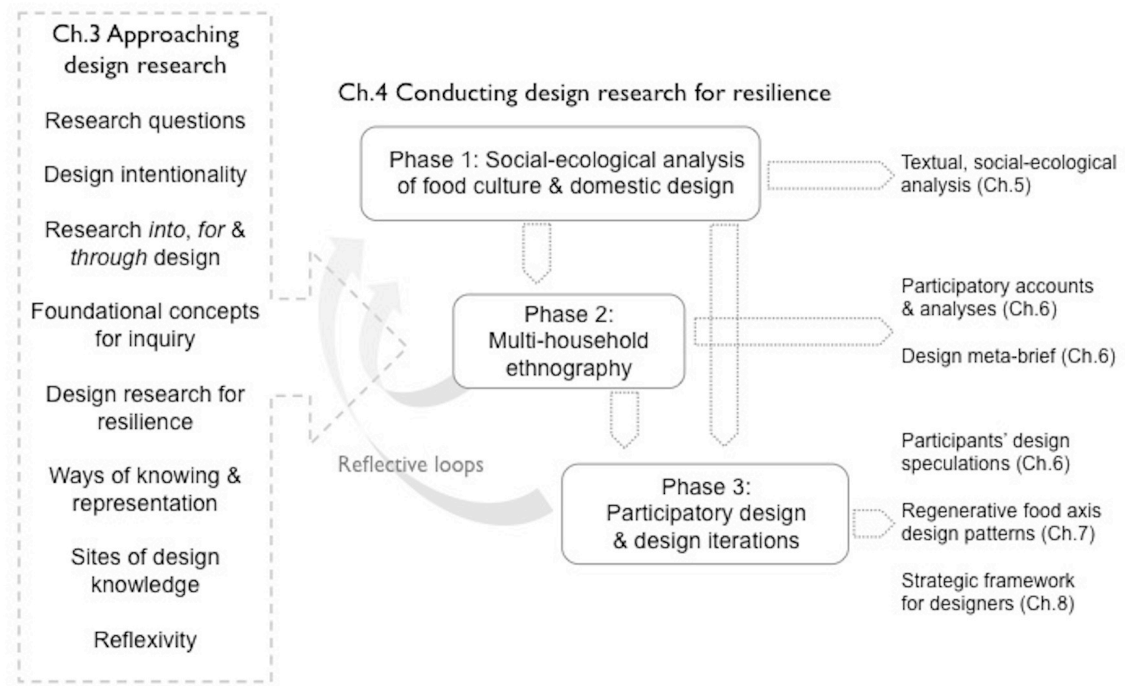


Figure 4.1: The research design, shaped by my approach to design research for resilience defined in Chapter 3, also indicating the outcomes of the three inquiry phases

This phased approach addressed the need for induction into my chosen methods, and recognised that with the development of greater reflexivity, I would revisit phases over the course of the study. In Figure 4.1, the arrows indicate how Phase 1 informed Phases 2 and 3, and how Phase 2 fed back to refine the themes developed in the representation of Phase 1. Ongoing critical reflection loops, symbolised by the curved arrows, were re-directed toward the written representation of all three phases, guided by Kvale's craft of inquiry involving "continually checking, questioning, and theoretically interpreting the [outcomes]" (1995, p. 27).

In Chapters 1 and 3, I foregrounded the foundational role of resilience concepts and highlighted their compatibility with practice theories, questions of type, and participatory design in this study, defining design research for resilience in the process. In Section 4.2, I interrelate these sets of concepts, and expand on how they have been applied to each of the study's three phases.

## 4.2 Resilience inquiry, practice theories, types and participatory design

In this section, I illuminate how my conduct of design research for resilience in this study applies the concepts for inquiry shown interrelated in Figure 4.2, and introduced in Section 1.4. I first interrelate resilience concepts with practices, Bourdieu's (1977, 1990) *habitus*, and housing types. I then highlight the compatibility between resilience strategies and participatory design, noting their interplay in Phases 2 and 3 of the study. I also acknowledge the diversity of the study settings in supporting consideration of spatial and temporal scales, a key factor in resilience inquiry (Biggs *et al.*, 2012; Moberg & Hauge Simonsen, 2011; Walker & Salt, 2006).

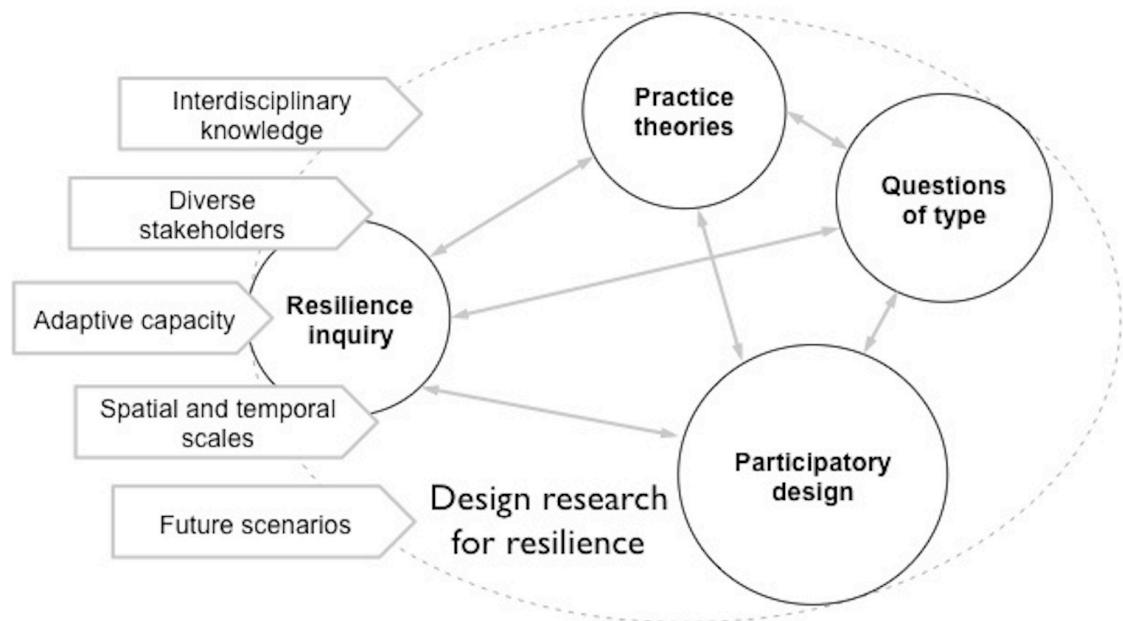


Figure 4.2: The interrelated foundational concepts for inquiry, highlighting the resilience strategies applied in the three-phase research design

### Resilience, practices, *habitus* and types

Against the backdrop of ecological overshoot established in Chapter 1, human practices of resource use, biodiversity reduction, waste, pollution generation, and material consumption have proven destructive on a global scale (Folke, 2013; Fry, 2009; McDonough & Braungart, 2002, 2013; McHarg, 1992 [1969]; Orr, 2002; Papanek, 1995). A resilience perspective subsequently motivated

**Phase 1** of the study, prompting identification of systemic factors and normative patterns – in housing, food provisioning, consumption and food culture – that diminish adaptive capacity at the domestic scale, and therefore undermine household and broader resilience. In the Phase 1 social-ecological analysis of dominant food culture and domestic design, I link our habitual, ecologically destructive practices with practice theories, and specifically Bourdieu's concept of the *habitus*.

While the concept has been variously interpreted and challenged (Silva & Warde, 2010), the notion of *habitus* is difficult to dispel in relation to design and culture. Understood as a system of ordering our perceptions and actions resulting from the objective structuring of prevailing social conditions, the *habitus* underpins one's practices and routine behaviours (Bourdieu, 1977, 1990). Rightly, Fry views design practice, with its intentionality and direction, intersecting with Bourdieu's *habitus* for the role the products of design play in our own 'predesigning':

[T]he perceptions we acquire are in fact prefigured by the structuring of structure of the world we see, come to know and act within  
...[*Habitus*] is constituted by the convergence of natality, sociality, mind and all other material/immaterial designing forces of the world in which one 'arrives' (Fry, 2009, p. 23).

In this light, suburbs, suburban housing, the surrounding urban form and the nearby supermarkets, for example, can all be seen as such objective structures, which in turn shape our fundamental perceptions and understandings of what constitutes 'housing', 'transport', 'food', 'cooking' and 'eating'. This objective structuring is significant given it also calibrates our practices in relation to, for example, consumption, energy, waste, resource and water use, and mobility.

Fry's interpretation of *habitus* resonates with the significance of types, introduced in Chapter 1, and their tendency to reinforce and replicate practices, whether of the built environment, broader material culture or the food system and its institutions. Types can be understood as contributing to the production of *habitus*, and in turn perpetuating ecologically destructive practices.

Immaterial designing forces are also at play, as Fry (2009) identified, rendering visual culture and discourse active within the *habitus*-practice dynamic. In this light, the home, the kitchen, and householders' everyday practices are particularly structured and structuring sites of our dispositions and perceptions. In Section 4.3, I detail the conceptual tools and methods borrowed from sociology and material culture studies applied to critically scrutinise these sites, employed in conjunction with an analytical framework of ecological design and ecological food principles (refer Figure 4.3).

Applying a resilience perspective once again, the Phase 1 social-ecological analysis prompted questioning of how alternative prefiguring structures and alternative housing types might *override* or *overwrite* one's *habitus*, and foster greater systems knowledge (Hauge Simonsen *et al.*, 2014), at the scale of households. The case presented by one older participant in the study, who grew up on a farm in a small regional village under self-sufficiency conditions, could well illustrate this point. With urban dwellers in mind, this prompted questioning as to whether alternative housing types and enhanced systems knowledge might transform the *habitus*, through which ecologically degrading practices are otherwise normalised. This interrelation of a key resilience concept – social-ecological systems knowledge – with the *habitus* and prefiguring role of housing types, primed my engagement in the **Phase 2** multi-household ethnography. In this second phase of the inquiry, I investigated the fit between ecologically literate food growing practices and existing housing types, as detailed in Section 4.4. I next interrelate resilience concepts with the participatory methods I adopted in Phases 2 and 3 of the study.

## Resilience and participatory design

My embrace of participatory design in this study intersects with two key resilience strategies; facilitating diverse stakeholder participation (Hauge Simonsen *et al.*, 2014), and collaboratively generating alternative, future scenarios to enhance adaptive capacity (Moberg & Hauge Simonsen, 2011; Walker & Salt, 2006). These two strategies underpin the **Phase 2** multi-household ethnography, and the **Phase 3** participatory design workshops. Restating the definition offered in Chapter 1, participatory design is “a form of design practice embedded in specific contexts and working with particular

constituencies to envision viable and desirable alternatives to the status quo” (Brown, Buchanan, Doordan & Margolin, 2012, p. 2). Conducted as inquiry, participatory design then presents the opportunity for specific contexts, constituencies, the *status quo*, and alternatives to it, to be explored and investigated with a depth and rigour beyond that typically supported within professional design practice.

In the service of a resilience agenda, the intentionality of design (as noted in relation to design agendas in the previous chapter) is directed in this study to collaborative, re-visioning design activities. To Simonsen, Bærenholdt, Scheuer and Büscher, “[d]esigning is intentional in terms of facilitating, encouraging, advancing, causing a change process that transforms one situation into another” (2010, p. 202). The change process is simplified by the authors in terms of ‘Situation A’ being transformed into ‘Situation B’. Applying this dynamic, the **Phase 1** social-ecological analysis can be viewed as the key means of gaining a contextual, problem-focused understanding of ‘Situation A’, as the critical basis for initiating change through participatory design processes in **Phases 2** and **3**. In this study, the participatory methods enabled my co-engagement in the food-producing activities of 12 households, and subsequent knowledge-making with participants, again emphasising social-ecological systems knowledge. **Phase 1**, and to a lesser extent **Phase 2**, were concerned with critically exploring the *status quo*, and identifying systemic and normative factors undermining resilience, as noted above. Particular emphasis was given to food choices, food preparation and eating in this initial analysis (detailed in Chapter 5), as I pursued a wider scope of inquiry than the relatively limited number of participants in Phases 2 and 3 would likely present.

With an orientation toward future scenarios in **Phases 2** and **3**, I sought to understand alternative practices and engage participants in envisioning viable alternative types, with the aim of devising urban resilience strategies. In **Phase 3**, the methods also involved a broader set of participants working to this objective in a series of design workshops. The participatory design processes also presented an opportunity to apply a resilience lens to the accepted ecological design tenets of re-purposing, retrofitting and adaptation, at the interacting scales of the home, community and suburbs. This exploration is

expressed through the multi-household ethnography of **Phase 2**, and the participatory design outcomes of **Phase 3**, forming Chapters 6 and 7. The diversity of household settings represented, and the phased enactment of the research design also supported a complementary consideration of spatial and temporal scales, as I elaborate in Sections 4.4 and 4.5. I next detail how Phases 1, 2 and 3 of the research design were conceived as an extension of the interrelationships above, the rationale for the methods adopted, their theoretical basis, forms of data, and analytical approaches.

### 4.3 Phase 1: Social-ecological analysis of dominant food culture and domestic design

Through a social-ecological analysis, derived from resilience inquiry and merged with methods of anthropology, sociology and cultural studies, I explored visual and material popular culture of the kitchen, cooking and related practices. My aim was to critically explore the dominant norms in Eurocentric food culture and related domestic design, and analyse these against accepted, relevant ecological principles, set out in Figure 4.3. The principles are distilled from my synthesis of the literature (scholarly and popular), with the sources set out in Chapter 5 (refer p. 124). The analysis was also founded on the prefiguring roles of *habitus* and types, stated above, as reinforcing and reifying the ecologically degrading *status quo*. As expressed in Section 4.1, my particular interest was in systemic factors and normative patterns that undermine household adaptive capacity. Balancing the ‘social’ and ‘ecological’, I sought to address the symbolic values and meanings encoded into objects and environments reflecting production-consumption imperatives, in addition to the identities and affective pursuits of people. The analysis is necessarily selective and unreservedly interpretive on my part, undertaken however with deference to the theoretical framework in this section, and extending into Chapter 5.



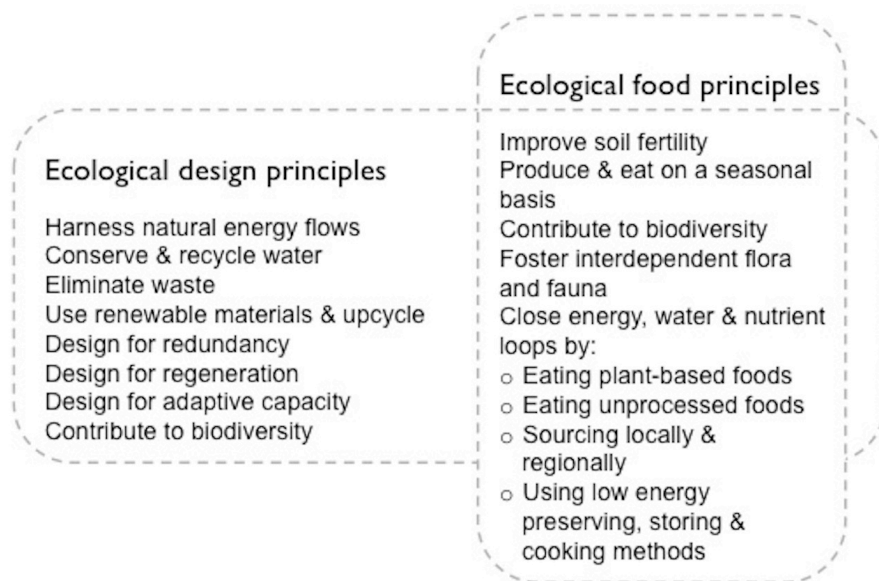


Figure 4.3: The ecological design and ecological food principles framework used in the Phase 1 social-ecological analysis

In Phase 1, I subjected a sample of artefacts to analysis, divided into two categories. The first category comprised objects and artefacts observed and experienced firsthand. The emphasis on firsthand analysis was informed partially by the visual sociological approaches discussed by Michael Emmison and Philip Smith (2000). These examples included food outlets, display kitchens, a display apartment, an appliance showroom and comparative, pre-industrial domestic settings. The second category consisted of constructed representations such as new kitchen advertising, 'foodie' television, design magazines, and web-based media. In these examples, the interplay of text and imagery was equally of interest, a key point raised in Jon Prosser's (2011, p. 480) work on visual methods. Across the sample, listed in Table 5.1 (refer pp. 124-125), I sought to balance as far as possible 'green' representations and objects with mainstream examples devoid of any such claim. The criteria for inclusion, rationale and processes of analysis are detailed below.

### Criteria for inclusion in the sample

In assembling the sample of artefacts from numerous contenders, I needed to balance and judge representation of the *status quo* with a manageable number of examples, proportionate to a contextual analysis forming only one phase of

the study. The first of two criteria for inclusion required prominence in popular culture as suggested by, for example, prime time broadcasting, nationwide or international outlets in the case of retailers, and web media with country or language specific sites signalling distributed markets. The second criterion was typicality in terms of common occurrence of the object or medium, its widespread access, and affordability. Examples targeting a niche, high income or elite market segment were therefore not sought. In the case of the pre-industrial domestic settings, they were included on the basis of relevance and access, the implications of which I address in Chapter 5.

## Phase 1 theoretical framework

The sample subjected to social-ecological analysis is based upon recognition of the 'visual availability' of culture, expressed by scholar of anthropology and sociology, Mike Ball. He refers to the built environment as "including items of material culture, persons and social actions ... visually available and symbolically significant when making visual sense of the seen world" (1998, p. 135). In seeking out a sense of the *status quo* in food culture, contemporary kitchen design and related practices as essential contextual analysis, I 'read' this symbolic assemblage of artefacts as simultaneously reflecting and constructing popular culture, cultural identity and their contingent practices. In this approach, I accept that aspects of Eurocentric culture centred on the kitchen and cooking are visually available for interpretation, without regarding the culture reflected to be objectively readable.

In the semiotic tradition, artefacts are considered as signs, bearing and projecting meaning; as anthropologist Christopher Tilley elaborated, "material culture becomes a text to be 'read', and a semiotic discourse to be 'de-coded'" (2001, p. 258). The de-coding does not, however, seek to extract a single, authoritative text from the objects and representations. In the case of examples inscribed with culturally comprehensible icons and symbols, such as the presence of an espresso coffee machine on a kitchen bench, my reading proceeded with some assurance that drinking espresso coffee is culturally esteemed though not universally so, that making espresso at home symbolises a particular cultural competence, and that the machine's presence is suggestive of a broader café culture outside the home, at least.

Semiotic approaches, as outlined by visual communications scholar Theo Van Leeuwen (2001), offer some utility to the analysis with their denotative and connotative tools, most appropriate to the advertising and marketing materials and objects in the sample. Given the persuasive function of these examples, I approached these with an expectation of de-coding one or more intentional texts or messages. My critical questioning of the *status quo* and dominant norms across the sample demanded more penetrating scrutiny. In response, I turned to the subjective and diagnostic meaning-making of iconological symbolism, which Van Leeuwen described as based on a “principle of integrative interpretation” (2001, p. 116). In practice, this demanded the analysis to proceed inter-textually using a range of comparative sources, scholarly and popular alike, within a theoretical framework and casting the examples against the broad ecological design principles introduced in Chapter 1, and refined in Figure 4.3.

The analytical approaches of cultural studies were also borrowed to extend the analysis beyond the interpretation of symbolic meanings. These approaches demand, according to sociologist Sarah Pink, a commitment to exercising reflective criticality in order to analyse “the social and cultural conditions within which [visual and material culture] are produced” (2007, p. 14). Focusing on the contexts of production of visual culture, the contexts of viewing, in addition to culturally shared forms, meanings and conventions, Martin Lister and Liz Wells highlighted “that looking is always embodied and undertaken by someone with an identity. ... [T]here is no neutral looking. An image’s or a thing’s significance is finally its significance for some-body and some-one” (2001, p. 65). In combining examples of visual and material culture in the sample, this emphasis on embodied ways of looking and experiencing were also applied to the analysis, invoking the multi-sensory design considerations explored by Karen Franck and Bianca Lepori (2007), and Juhani Pallasmaa (2005).

Further emphasising the ‘social’ in the social-ecological analysis, contemporary theories of material culture studies offered deeper grounding and analytical tools, namely ‘material agency’ and ‘emergent agency’. The interwoven layers of meaning encoded in objects and representations, described above, are

understood to simultaneously reflect and reinforce the embodied cultural identity of people (Tilley, 2001). Material things can therefore produce an effect – cognitive and affective responses, actions, particular practices – within and by people in what Tilley termed “a generative dialectic between things and persons in which neither is granted primacy” (2001, p. 261). Posing a simple example, an island kitchen bench at which stools are positioned on one side can effect sitting. At an interactional level, the same stools might effect sociability, and perhaps the sharing of cooking tasks while household members catch up on the events of the day. The stools, appliances and kitchen joinery, in turn, presuppose particular body shapes and sizes. Things and people are understood therefore, to be in a dynamic and evolving interplay.

I also regarded the metaphor of the ‘dance of agency’, conveying this human agency-material agency dynamic, to be of compelling analytical value. Proposed by science and technology studies scholar Andrew Pickering, the dynamic involves “a temporally extended back-and-forth dance ... in which activity and passivity on both sides are reciprocally intertwined” (2010, p. 195). Applied to my examples, Pickering’s temporal emphasis provokes speculation of potential effects beyond the moment in time captured in a single image, or the limited duration of my own observation of an object. Further, Pickering’s work provokes critical questioning of the potential effects of an object or thing beyond those intended by the progenitor. Such effects, unknown in advance, are described in terms of ‘emergent agency’ (Pickering, 2010, pp. 195-198). This propensity resonates strongly in relation to product design, with implications for ecological design. Exemplified by Shove and Southerton’s (2000) tracing of the domestic freezer’s genesis, the freezer’s emergent agency played a role in the demise of backyard vegetable gardens, as well as the ascent of industrially produced frozen, convenience food. This account presented a poignant example of the progressive erosion of household adaptive capacity, amplifying into a broader undermining of urban resilience.

## Analysis through representation

In Chapter 5, the inter-textual nature of the social-ecological analysis manifests, and the theoretical approaches above are seized with differing weights relative to the object in focus. In this sense, the analysis is presented from a point at

which I have synthesised and distilled four salient themes: diverse food lives and meanings of cooking; consumption centred on the kitchen and the 'art of lifestyle'; ecologically significant transformations in kitchens of the past; and the 'greening' of the contemporary kitchen. The initial perceptions and meanings emerging via the four themes are shaped unavoidably by my primary engagement to date with 'conventional academic representation', which Pink argued has the potential to obscure and abstract (2007, p. 6). By weaving Phase 1 throughout the study however, my analysis was balanced by reflective loops resulting from the experiential and practice-based emphases of Phases 2 and 3 (refer Figure 4.1).

As noted, Phase 1 and its representation through Chapter 5 involved a highly interpretive approach to inquiry. With my commitment to Kvale's communicative validity (1995, pp. 30-32), the ideas, insights and arguments appearing in Chapter 5 resulted from their earlier communication in a number of fora followed by critically reflective cycles. In line with the interdisciplinary subject matter, the ideas were ventured during 2012 and 2013 within a national housing symposium, an international food systems conference, and an international sustainable craft and design conference. The ideas were also subjected to peer review through journal article submission, and among postgraduate peers in university-based seminars. In addition to crediting the constructive feedback I received in these fora, along with that of my supervisors, this account serves to illustrate the protracted dialogue and reflective cycles that might underpin communicative validity in practice. In the following section, I set out the purpose, theoretical framework and analytical approach of Phase 2.

#### 4.4 Phase 2: Multi-household ethnography in food-producing settings

The purpose of the Phase 2 ethnography was to experience and describe practices associated with home-based food production, integral to the broader sustainable living approaches of householder participants. As outlined in Section 4.1, this phase was concerned with both the *status quo* and its types, in addition to alternative practices and adaptations that could inform alternative,

future types and scenarios. Under critical observation relative to these practices, were participants' interactions with the material home environment, in addition to existing spatial and functional interfaces between kitchens and gardens. To this end, the core ethnographic methods of in-situ observation and participation corresponded with my desire to experience a range of domestic environments *from the inside*, and understand them as far as possible through co-engaging in the practices of householders. This reflects one of the key ways of knowing I identified in Chapter 3.

The critical questioning brought to these study settings was provoked by the fact that the majority of housing stock was built in the latter half of the twentieth century during an era of cheap energy and the ascent of the industrial food system, observed in Chapter 1. Dominant, contemporary housing typologies and construction modes were also templated during this period, as discussed in Chapter 2, acquiring their prefiguring tendencies and underscoring the importance of temporal scale. Borrowing Christopher Alexander's (1964) seminal notion, the multi-household ethnography therefore queried the 'fit' of existing housing with, and its ability to support home-based food production and other alternative, ecologically-aware household practices. The ethnography was considered an extension of the participatory design approach with a view to participants continuing their involvement into Phase 3, should they wish. Fortunately, this transpired, making for vibrant workshops and a more productive overlap between the two phases.

Phase 2 was prefaced by several scoping visits to community gardens, city and rooftop farms (Melbourne and New York City); cooking school and restaurant kitchen gardens using organic methods (Devon and Oxford, England); the bespoke, multi-use 'circle of life' house included as a precedent in Section 2.4 (Jämtland, Sweden); and a selection of productive home gardens tended by friends and family in various locations. These visits served to develop my knowledge of diverse growing and producing approaches, such as permaculture and urban agriculture. I also observed and documented the integration of water, energy and nutrient cycling systems, considering the implications of climate and scale relative to urban form at each of the sites visited.

Subsequently, I sought study settings representing a range of housing density and tenure types in reflection of the housing situation in Australia, and adopting the resilience concern for inter-scalar considerations. During February to April 2013, I made half- to full-day observation and participation visits to 12 different homes in Tasmania comprising four rural settings, one of which combined a family home and cooking school, five suburban settings, two medium-density and one high-density setting. I invited participation through sustainable living and alternative food groups via email and social media sites, setting out the range of housing types and densities sought, and specifying involvement in food production and a commitment to sustainable approaches. Prospective participants were invited to contact me for more information on the study and to pose any questions. Some sent photos of their gardens at this point and described their approaches, checking for suitability. The 12 selected settings are profiled integral to their analysis in Chapter 6.

This contemporary ethnography contrasted markedly with its early anthropological foundations in which predominantly European men studied distant places and exotic cultures, writ large by Bronislaw Malinowski in the 1920s, and throughout the twentieth century by Clifford Geertz (Atkinson, Coffey, Delamont, Lofland, & Lofland, 2001; Plowman, 2003). In the context of participatory design, Jeanette Blomberg and Helena Karasti observe a convergence between ethnography and cooperative design with a potential 'continuum of roles' for the designer/researcher (2013, p. 91). Ethnography and design are now hybridised further through design interventions grounded within specific social settings in the emergent field of design anthropology (for example, Halse, 2008; Gunn, Otto & Smith, 2013). Applied ethnographies, including my own, are approached with particular agendas, intentions, and sets of theories or structuring principles, with researchers seeking outcomes extending beyond the description and representation of a selected context. My adoption of ethnography aligns with Norman Denzin's comment that its methods may be multi-sited and concerned with "the vaguely unfamiliar familiar" (1997, p. 285). Pink's characterisation is of methods that may "entail reflexive, collaborative or participatory methods" with participants involved "in a variety of ways at different points of the research and representational stages" (2007, p.

22). This description corresponds with the methods and overlapping participation between Phases 2 and 3 noted above.

### Forms of data and analytical approach

Common to ethnographic approaches are forms of data generated 'in the field', such as notes, sketches and photographs. Expanded records of dialogue and reflective accounts are also commonly created after conducting observation and participation activities. I generated all of these data types during my household visits, using a single page prompt form to support loosely structured conversations and notation. The form's seven categories derived from the scoping visits, pre-reading and my own experience: (1) water (2) energy and nutrient cycling (3) growing methods (4) harvesting / kitchen (5) preserving (6) storing, and (7) other – house / sun access / improvisations (refer Appendix A). As participants expressed their interest in the study via email, setting off a dialogue, I came to include the email dialogue as data because participants introduced themselves and their gardens through this medium, some sending images or links to blogs and websites, also volunteering follow-up information by email after my visit in a few cases.

The analytical approach was seeded by those seven categories included on the prompt form, intersecting with the key issues of urban form, density and tenure that I foregrounded in the literature review of Chapter 2. The approach was developed further by my original commitment to provide participants with a summary of Phase 2, made in the knowledge it would demand a prompt preliminary analysis. This was represented in a concise booklet and sent to all participants in August 2013 (refer Appendix B). The booklet served to communicate my understandings and insights back to participants and invite their feedback and questions, again guided by Kvale's (1995) communicative validity. I was conscious of attempting to represent participants' actions textually and visually, given the necessity to apprehend participants' experiential and embodied knowledge in limited timeframes. Practising Kvale's (1995) craft of inquiry, I worked iteratively between my field notes, reflective accounts, images, and sketches, contrasting these with the claims I was drafting in the summary for participants. Deeper analysis then followed using a conceptual matrix I devised, discussing four focus areas – growing and producing methods,



harvesting and provisioning, preserving and storing, and householder-initiated adaptations – relative to scale, density and tenure.

In order to consider the settings in an inter-scalar, relational manner, I proceeded from the rural scale to the high-density, due to the rural settings presenting a greater diversity of production methods, food types, and cycling systems which offered a comparative basis for the smaller scale settings. This analytical framework, its process and outcomes are reported fully in Chapter 6. I also identified two emergent themes inviting more focused exploration as resilience-building strategies: the resurgence of homecraft in sustainable living, and domestic re-use and adaptation, both of which are developed integral to my design iterations in Chapter 7.

## 4.5 Phase 3: Participatory design workshops and design iterations

Driven by the resilience strategies of diverse stakeholder participation and future scenario generation outlined in Section 4.1, a series of three participatory design workshops led on from the multi-household ethnography. These involved a subset of Phase 2 participants along with interested others. The purpose of the workshops was to generate speculative design responses to the overarching question: ‘how might dwelling and garden space be designed to best support regenerative growing and producing practices?’ The resultant responses took the form of symbols, maps, lists, diagrams and sketches. The workshops were facilitated by a longstanding teaching colleague and mentor who also served as a consultant for the duration of the study, sharing her combined expertise in ecological design, horticulture and permaculture. This facilitation strategy allowed me as researcher to listen attentively, take notes, and engage fully in participants’ discussion and representation processes.

### The workshop activities

In outline, the workshop activities and representation options were devised in response to the following objectives:

- **Elicit meanings of ‘sustainable food’ and ‘sustainable food practices’** as foundational to the analysis of the design responses generated within the workshops;
- **Map participants’ food provisioning habits** and consider these in relation to the home-based food production approaches documented in Phase 2;
- **Identify any dilemmas faced by participants** in enacting their commitment to sustainable food practices, with an emphasis on **spatial and material factors**; and
- **Enable participants to represent speculative and idealised arrangements of domestic space** to better facilitate their sustainable food practices.

Equally, the workshops offered participants the opportunity for enjoyable knowledge sharing and learning, in line with my value for reciprocity. The approach was contingent upon participants’ firsthand experience of the practices of growing and producing food, integral to related practices such as gardening for biodiversity and land remediation, and water and energy harvesting and cycling. The expectation was for this experiential and embodied knowledge to be encoded into participants’ design responses. Further, workshop attendance de-situated participants from their own home-garden context, opening the possibility for their contributions to integrate the diverse, brainstorming ideas of group exchange.

This workshop approach was underpinned by multiple theory-practice conjoining strategies, again intersecting with participatory resilience-building strategies. The first is Toni Robertson and Jesper Simonsen’s practice-focused framing of participatory design, echoing my own intent for the workshops: “When different voices are heard, understood and heeded in a design process, the results are more likely to be flexible and robust in use, accessible to more people, more easily appropriated into changing situations, and more adaptable to these situations over time” (2012, p. 6). In a second strategy, the facilitator and I were aware of emulating approaches from professional practice intended to foster enhanced client dialogue and input into projects. These included adapting to the language and terminology used by participants, welcoming

participants' meaningful examples and stories into the workshop, and being flexible with the activities and representation options, as I discuss below.

In a third theory-practice conjoining strategy, the facilitator and I also recognised representation as a factor crucial to the success of the workshop approach. The representations made by participants – symbolic images, maps, lists, diagrams and sketches – were viewed as artefacts embedding existing knowledge and practice, but also positing potentially new, 'what-might-be' scenarios. This generative, re-visioning process evokes once more the inquiry-through-design approaches described by Armstrong (2000), Downton (2003) and Franz (2000, 2007). Transposed to this study, the artefacts emerging from the workshop were subject to reflection, inter-textual readings and further synthesis akin to these authors' studio-based examples of graduate student work.

The informal studio of the workshop interrogated different aspects of the overarching question, and offered multiple, playful modes of expression to encourage *ease of representation* for participants, enlivened by their annotations and spoken dialogue. Aware that the challenge posed by the task of representation itself might de-focus the substantive questions core to the activities, I pitched the eventual tasks relative to observations noted in the Phase 2 visits. A proportion of participants displayed spatial diagrams of their gardens, including planting layouts and bed rotations they had already created. Others made reference to their use of such diagrams in books, magazines and online resources, indicating considerable visual and spatial literacy. Prospective participants were also assured in the invitation that drawing skills were not required. The expressive and detailed outcomes included in Chapter 6, suggest that the workshops fostered relaxed and fluid engagement by participants.

### Forms of data and analytical approach

As suggested by the discussion of representation modes above, the forms of data generated in the workshops were diverse. In addition, the dialogue was captured via audio recording, I made notes during activities, and wrote a reflective account after each workshop's de-brief discussion with the facilitator. I outline in Chapter 6 how the workshop approach evolved as a result of the

reflective data generated. Given that I considered participants' design representations as both artefacts for interpretation and for further synthesis and development via my design iterations, the analysis became two-pronged. Carrying through my interest in issues associated with urban form, housing types, density and tenure from Phase 2, I was first keen to capture *transferable* particularities related to these factors within the design representations. In this sense, I did not set out to aggregate or conflate participants' responses and speculations for the primary purpose of generalising, as is common in interpretive inquiry. The inter-textual visual methods I adopted in Phase 1, detailed in Section 4.3, were again useful in this process and were richly augmented by having been present and engaged in each workshop.

The second prong of the analysis employed brief writing as an analytical tool, and a further means of generating and representing future scenarios. Conceptually, the resultant meta-brief was spurred by discussion of contrasting approaches to the design brief in professional practice by Karen Franck and Theresa von Sommeruga Howard (2010), in tandem with the pattern language devised by Alexander, Ishikawa and Silverstein (1977). The primary appeal of the pattern language is its ability to capture the particularities of differing design contexts understood as social contexts, at interconnecting scales. The workshop design representations were therefore discussed according to issues of scale, housing types and norms, dwelling layout and the kitchen-garden interface, rippling out to broader, relevant social considerations. This discussion then informed the formulation of the meta-brief for 'food axis design patterns' serving as the conclusion to Chapter 6, and directing my own design iterations in Chapter 7.

## Design iterations

Phase 3 also included my own design processes parallel to, and extending beyond the series of participatory design workshops. The purpose of generating the design iterations was to integrate the social-ecological analysis of Phase 1 with the outcomes of the participatory methods of Phases 2 and 3. The meta-brief described above directed my design process, coupled with the third research question: How can design research propose alternative, regenerative kitchen-garden systems as an urban resilience strategy? In a question

Blomberg and Karasti (2013) raise in relation to ethnography and participatory design – that is, when to begin designing – I desisted from designing my own responses until this stage. Despite the ethnography inspiring ideation, I judged that undertaking concurrent design processes would dilute my focus on the richness of householders' settings and practices. Instead, I channelled my designerly motivations to critically evaluating my home, the 'living lab', and determining its role in the design iterations, clarified in Chapter 7.

The initial problem definition for this design process posed the question of how to articulate and represent new, transferable knowledge through design, in a dilemma common to all practice-based research (Haseman & Mafe, 2009). The design iterations featured in Chapter 7 were preceded, therefore, by a process of designing a theory-grounded mode of representation. Following the application of the pattern language schema (Alexander, Ishikawa and Silverstein, 1977) to the workshop analysis and meta-brief writing, I pursued a conceptual merger of design patterns with the food axis of Collins Cromley (2010), identified in Chapters 1 and 2 as a potential design heuristic. With a goal of transferability of new knowledge, this direction was reinforced by the application of a design pattern language to the field of educational design (Conole, 2013; Goodyear, 2005), and the conscious representation and emulation of nature's patterns in permaculture design (Holmgren, 2002).

The 'regenerative food axis patterns' of Chapter 7 emerged from this process, each coupled with likely food producing practices at a range of scales, and illustrated via spatial-material examples. These outcomes propose alternatives to the *status quo* portrayed in Phase 1, embedding practice-derived ecological literacy to re-cast the prefiguring structures of housing types. In order to communicate and trial the transferability of these alternatives, I looked beyond the critical dialogue afforded by the thesis writing process. In Chapter 8, I have distilled a framework for integrating housing and regenerative food systems with design practitioners in mind. Extending my commitment to transferability beyond the thesis, the framework is intended for peer review, refinement, and subsequent publication targeting ecological design practice and education.

## 4.6 Conclusion

Having ventured a practice-centred approach to design research for resilience in Chapter 3, I have moved from the general to the specific in this chapter, detailing its conduct in this study. This chapter consequently represents a partial response to the third research question, by making explicit *how* urban resilience strategies can be proposed through design research. The research design detailed, reflects the interrelation of the contingent concepts for inquiry – resilience strategies, practice theories, questions of type and participatory design. I have articulated too how the wider re-contextualisation of theory and analytical tools, such as those of sociology, anthropology and material culture studies, can underpin social-ecological knowledge-making, in the service of a resilience agenda. Tracing back to the research questions posed in Section 3.0, I have also demonstrated how these three drivers of the inquiry translate to the three phases of the research design, broadly reflecting research *into*, *for* and *through* design. In seeking to critically explore the connections between food and housing representative of the *status quo* in Phase 1, in response to the first research question, I devised a social-ecological analysis drawing on resilience inquiry, with a particular concern for systemic factors and normative patterns eroding urban adaptive capacity. Interweaving and guiding this interpretive analysis are practice theory concepts, including Bourdieu's (1977) *habitus*, and material and immaterial interplays with everyday practices (Fry, 2009; Pickering, 2010; Shove & Southerton, 2000).

By embracing ecologically literate food-producing practices as rich sites of experiential and embodied knowledge, the second research question directed investigation of their fit with existing housing typologies. In response, the multi-household ethnography comprising Phase 2 supported my co-engagement in participants' practices as a further means of making new social-ecological knowledge. The third research question challenged design research to propose viable alternatives to the *status quo* in the form of regenerative kitchen-garden systems, conceived as resilience strategies. In setting out the participatory design workshops and design iterations of Phase 3, I have highlighted the importance of understanding targeted practices as the key drivers of future, alternative spatial-material types in ecological design. I also made apparent the

dilemma inherent within practice-based research, in determining transferable modes of new knowledge representation, integral to the design process.

The subsequent representation of outcomes of the study forms Chapters 5 to 8 of the thesis, progressively integrating the research *into*, *for* and *through* design phases. The social-ecological analysis of dominant food culture and domestic design follows in Chapter 5, prefaced by the analytical framework of ecological design and ecological food principles and the sample of artefacts subjected to analysis.





# 5

## The kitchen: Four social-ecological readings

### 5.0 Introduction

This chapter comprises the outcomes of the Phase 1 social-ecological analysis, represented through four thematic sections and prefaced by a set of ecological design and ecological food principles. I set out to explore dominant norms in Eurocentric food culture and related domestic design using the sample of material and visual culture presented in Table 5.1, subjecting this collection to textual analysis drawing on scholarly, technical and popular sources. The analysis, as research *into* design, is both an exploration of context and recognition that the products and processes of design shape everyday practices with social and ecological reverberations, as established in Chapters 1 to 4. The analytical matrix I employ enables the sample to be read and discussed in relation to the range of interdisciplinary sources, and re-read via intersecting ecological principles. The necessity to contain the scope of the analysis is imposed by the size of the sample of objects and artefacts, and my aim to elucidate issues most germane to ecological design.

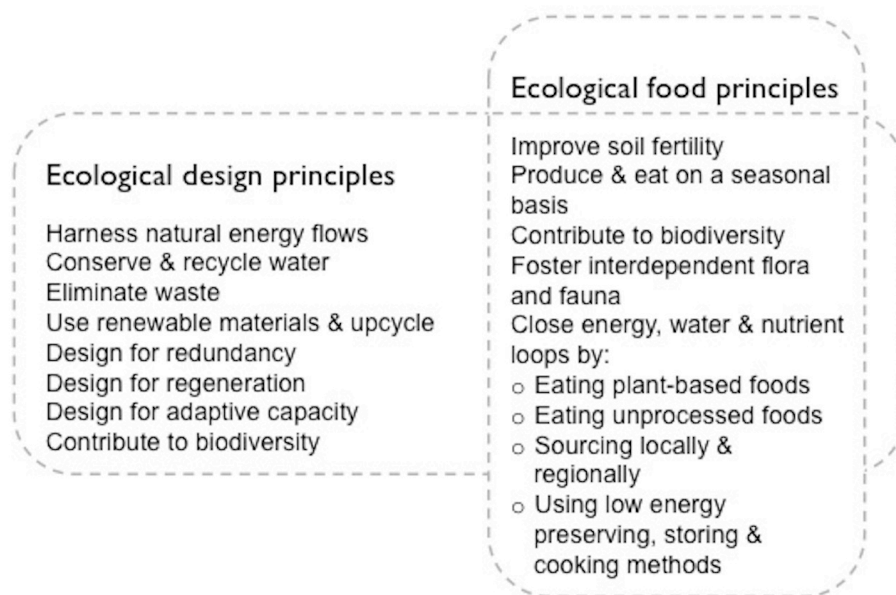


Figure 5.1 Ecological design principles intersecting a set of core ecological food principles, forming the analytical framework for the four readings (reproduced from Figure 4.3)

The set of ecological principles in Figure 5.1 is distilled from the Hannover Principles proposed originally by McDonough (1992); McDonough and Braungart's (2002, 2013) cradle-to-cradle and upcycling ethos; Ken Yeang's (2011) ecoinfrastructures and eco-design strategies; and Rottle and Yocom's differentiated discussion of sustainability, regeneration and resilience (2010, pp. 76-79). These principles offer a more detailed expression of the ecological imperatives introduced in Chapter 1. Intersecting the ecological design principles is a further set of ecological principles pertaining to food production, preparation and eating. This subset of principles is derived principally from Dahlberg's early work on regenerative food systems (1993), Pretty's (2002) critique of industrial-scale agriculture, Millstone and Lang's (2008) global food system atlas, and the recent Australian Food Sovereignty Alliance's *People's Food Plan* (Parfitt *et al.*, 2013). While these principles span food production, storing, cooking and eating, they also imply reconnection between actors in the food chain that is both values- and knowledge-based, expressed through philosopher Lisa Heldke's (2007) 'food citizenship', involving a 'fabric of relations'. Consumers become 'co-producers', as urged by Slow Food (Hall, 2012), when forming relationships with producers at the farmers' market, for

example, and accepting greater responsibility for their food supply and the livelihoods of small-scale producers.

The sample of objects and artefacts in Table 5.1 was selected on the basis of prominence in popular culture, in addition to typicality arising from access and affordability, as detailed in Section 4.3. They comprise two categories: objects and artefacts observed and experienced firsthand, and representations of objects and artefacts appearing within media and advertising, each category forming a column in Table 5.1. While the sample is reflective of dominant norms and cultural products, I cannot make full claim to comprehensive representation. The norms represented by the sample span food choices, supply and provisioning; kitchen design and renewal; kitchen appliance types and marketing; food media and celebrity; and ‘green’ design applied to housing, kitchens and appliances. Those items tabled result from my aim to analyse and foreground what I judge to be key social-ecological issues. Items are grouped in relation to one of the four theme sections in which they are discussed, and where retrievable, items are referenced conventionally within the text.

Theme title	Object / artefact observed firsthand	Representation of object / artefact
<b>1. What’s cooking in your kitchen</b> (Section 5.1)	Woolworths supermarket product ranges, Central Hobart	Australian Guide to Healthy Eating infographic
	Northey Street City Farm Organic Farmers’ Market, Windsor, Brisbane	
<b>2. Kitchens, consumption and the art of lifestyle</b> (Section 5.2)	IKEA kitchen showroom, Adelaide	‘Now we’re cooking’, <i>Weekend Australian</i> newspaper supplement article
	Beijer kitchen showroom, Bollnäs, Sweden	Impala Kitchens website
	Harvey Norman appliance showroom, Hobart	Kitchen Connection website
	Jamie Oliver Home Cooker and Cutter Tower	IKEA Kitchen Cabinets web page
	Jamie Oliver 10 Brilliant Fish	<i>Nigellissima</i> television series,

	Fillet Fingers	2012 nigella.com website
		<i>Jamie's 30-minute Meals</i> television series, 2010 jamieoliver.com website
		<i>MasterChef</i> Australia television series, 2012-2013
		<i>The Great British Bake-off</i> television series, 2010-2013
		<i>Heston's Fantastical Food</i> television series, 2012
<b>3. Past lives of the kitchen</b> (Section 5.3)	River Cottage, Park Farm, Devon, England	
	Runnymede, National Trust property, Hobart	
	Torslund, family home, Vallsta, Sweden	
<b>4. 'Greening' the kitchen: Counterparts and ecological agents</b> (Section 5.4)	Display apartment, Southbank, Melbourne	IKEA Secondary Storage web page, 2012
	Harvey Norman appliance showroom, Hobart	'Australia's Greenest Kitchens', <i>Sanctuary</i> design magazine, Nov-Dec, 2011
		'Front & Centre' kitchen annual review, <i>green</i> design magazine, Nov-Dec, 2013
		Electrolux Switch Up to a Greener Lifestyle web page

Table 5.1 The sample of dominant Eurocentric material and visual culture subjected to analysis and arranged by theme

The four themes in Table 5.1 also reflect the organisation and structure of the chapter. The first theme explores meanings of cooking and the diverse cooking lives of householders relative to social and cultural conditions, forming Section 5.1. Supermarket ranges and national dietary guidelines, for example, are among those mechanisms working against the adoption of ecologically aware

food choices. The contemporary kitchen as an intensive site of consumption is the focus of the second theme, in Section 5.2, linking its increasingly symbolic role to the frenzied imagery of the largely ecologically-blind food and lifestyle media. The third theme, forming Section 5.3, looks to kitchens of the past for their pre-commodity significance, illuminating nodes along their historical trajectory that have wrought ecological disconnection. In Section 5.4, I scrutinise the kitchen's 'greening' in the fourth theme, distinguishing approaches that effectively maintain the *status quo* on the one hand, and challenge it on the other. The challenge identified involves designing ecological agents that seek to foster ecologically literate household practices. I conclude the chapter with a contextual summary to inform ecological design, and as a primer for re-visioning the kitchen as an 'ecological agent' in Chapters 6 and 7.

## 5.1 What's cooking in your kitchen?

Analysing the kitchen against the ecological design and food principles above, integral to the social and cultural contexts within which kitchens are located, demands scrutiny of its contemporary status. The functional primacy of food storage, preparation and cooking has been expanded and in some contexts, re-ordered over several decades by the range of social and identity-related roles now assigned to the kitchen. A comprehensive understanding of what goes on in the kitchen – the practices of provisioning, cooking, and consumption of food, relative to social and cultural backdrops – is therefore crucial to my critique of the *status quo* in domestic design centred on the kitchen, and food culture more broadly. What constitutes 'cooking' and what it means to different people, on different occasions, is by no means straightforward, as Frances Short explored in her valuable British study reported in *Kitchen Secrets* (2006).

In scanning the magazine racks of a newsagent on one's way home from work, passing the sumptuous window display of a major department store, followed by a few hours of primetime television, one could be convinced that *everyone* is cooking, and eating exceedingly well. Yet a proportion of Australians continue to experience food insecurity (Burton *et al.*, 2013), with demand for food relief rising markedly in New South Wales and the Australian Capital Territory (King, Bellamy, Kemp & Mollenhauer, 2013). A stroll through the aisles of Woolworths,

one of Australia's two dominant supermarket chains where the majority is sourcing its food, reminds us that so many of the products on sale are already 'pre-cooked' in the sense that they are already highly processed at the point at which they are purchased as 'ingredients'.

Subscribing to a dichotomy between 'real' versus 'convenience' food however, is a temptation against which Short (2006) and Rousseau (2012) caution. At risk of erasure are the moral-ethical and practical complexities of everyday food provisioning and cooking practices. To Warde, convenience food was a "hypermodern response to de-routinization" (1999, p. 1), the success of which has been supported by the domestic technologies that permit time-shifting in intricately scheduled lives. Doubtless, cooking has been re-defined by modernity and the social and technical structures that connect domestic kitchens with the global, industrial food system. Food industry market research, as Michael Pollan (2013) discovered, has actively propagated a notion of 'cooking' as the assembly of processed food products. Capturing the plurality and hybridity of contemporary cooking, Short describes a "heterogeneous mix of the fresh, the raw and the pre-prepared, the new and the traditional, [and] the technological and the manual" (2006, pp. 113-114).

In my conception, cooking is an inherently ecological act, but this partial perspective derives from engagement with an alternative food movement and its values, shared only with a minority. Alert to Heldke's (2007, para. 35) caution in relation to the exercise of 'moral purity' and 'moral competitiveness' within alternative food movements, I recognise a diversity of cooking lives and the relative privilege that enables me to pursue ecological food principles. In wider society, the complexity of food choices and cooking practices is in part attributable to gender, age, socio-economic background and ethnicity, factors discussed in the late 1990s from a social anthropological perspective by Caplan, Keane, Willets and Williams (1998). Updating the significance assigned to social and cultural factors, Short concluded of her study of cooking and its meanings:

People's cooking lives cannot be separated from their wider lives, from their access to food and information about food, from the social and cultural settings in which they live and their generation and gender, from mediated constructions and shared beliefs and values, from their religious and ethnic background, from their personality and from the responsibilities they have for providing food for others (2006, p. 118).

Subsumed within Short's summary are critical issues of class and identity, played out in the food choices and cooking practices of individuals, households and groups. Analysis of food, class and identity is extensive across the literatures of sociology, anthropology and cultural studies (examples of which I have drawn upon include Ashley, Hollows, Jones & Taylor, 2004; Bourdieu, 1984; Freeman, 2006; Short, 2006; Warde, 1997). Emergent intersecting fields, such as culinary tourism, are also enriching this discourse (for example, Hall, 2011; Hall & Gössling, 2013; Timothy & Ron, 2013). Given Warde's contention that food choices and cooking practices still "remain embedded in socio-demographic collectivities" (1997, p. 125), I make three observations illuminating food-related class and identity issues in a contemporary context, which I subsequently suggest work against a wider adoption of ecological food practices. The first is the persistent need for households to negotiate social disadvantage; the second stems from competing food requirements within households based on increasingly common health and medical issues; and the third relates to 'practising' food as lifestyle, in conjunction with affluence and the construction of 'foodie' identities.

Socio-economic disadvantage is a persistent reality for a proportion of Australians, most notably in remote indigenous communities (Burton *et al.*, 2013). While food insecurity is experienced as a result of low income (Rosier, 2011), food choices and practices may also affirm and reinforce class-related identities. In discussing British working class food choices, for example, Ashley, Hollows, Jones and Taylor (2004, p.65) noted the social codes through which people categorise foods as 'their kind of thing', or not. This social regulation of

food choices may be further reified by urban form and mobility factors, such as those identified by Gleeson (2010) in relation to food deserts, as introduced in Chapter 2. In these conditions, access is limited to a range of affordable fresh produce, with often greater access to fast food and processed food outlets such as fuel station complexes; a trend that school kitchen garden projects have sought to redress, as I later elaborate.

While the majority of Australians are considered food secure (Rosier, 2011), there may exist competing requirements within the same household, irrespective of class, due to the need to manage multiple health issues and risks (Coveney, 2006). Such issues might include food allergies, diabetes and obesity-related illnesses. In analysing the Woolworths supermarket ranges, for example, I observed a proliferation of differentiated food products corresponding to a host of dietary needs. These foods are an extension of the shift to 'nutritionism' that Micheal Pollan (2008) began to observe in the late twentieth century. This strategy on the part of the industrial food industry, in turn consolidates the role of the supermarket as the 'one stop shop' for household provisioning and mediating household members' dietary constraints.

For the affluent and relatively healthy, higher incomes afford more options to engage with food as a lifestyle pursuit, and for the expression of identity as 'foodies' and locavores (Delind, 2011). When performed through informal and formal membership in gastronomic movements (such as Slow Food), this exemplifies the kind of conscious 'communalisation' C. Michael Hall (2011) describes as occurring within class formation (in the context of tourism analysis). While foodies often participate in alternative food networks via farmers' markets and small-scale, artisan producers, their practise of food as lifestyle is frequently related to higher consumption patterns, including culinary tourism (Hall & Gössling, 2013). In aggregate, food-as-lifestyle may well involve the performance of identities and practices considerably at odds with the ecological food principles set out in Figure 5.1.

Class and identity are therefore critical factors at play in the advancement of ecological food principles and practices, but they do not pose outright barriers to a greater ethical-ecological engagement with food. The alternative food



movements introduced in Chapter 2 reflect a distinctive shift arguably less tied to class and identity, than to what Murdoch and Miele (2004) termed a knowledge-contingent 'relational reflexivity'. In these current movements, people largely reject and disconnect from the industrial food system, in order to reconnect with alternative food systems according to various environmental, social and cultural agendas. Foregrounding food system awareness, food co-production, health and cooking skills as enablers of social change, alternative food movements engage consciously with social difference and disadvantage, in turn forging new social collectivities. Among those to have emerged are Fairtrade Towns, food sovereignty alliances and the community-supported agriculture schemes, all profiled in the literature review of Chapter 2.

### Cooking for health and what the guidelines say

Cooking according to 'popular nutrition principles', as termed by public health scholar John Coveney (2006, p. 128), is common to several social collectivities irrespective of their motivations. These principles were communicated most recently via the Australian Dietary Guidelines (NHMRC, 2013). Fresh vegetables and fruit take prominence, followed by grains and legumes, meat and dairy. Fats, along with alcohol and all processed, fast and snack foods, have been expelled from the prescribed foods circle to 'small amount' and 'only sometimes' consumption (NHMRC, 2013, p. 4). While seeking to improve cooking and eating habits using a greater proportion of whole foods, these guidelines reflect mainstream provisioning practices and correspond neatly to the supermarket food supply (if one avoids most of the high energy, low nutrition, high salt product ranges on offer). Meanwhile, an army of food scientists is devising novel, differentiated food products for renewal of those product ranges and to sell to new markets. This is only one of many opportunistic food industry practices challenged by nutrition and public health scholar, Marion Nestle (2002).

Despite acknowledging ethnically diverse and vegetarian food choices, the dietary guidelines presume and convey a nationally uniform stock of always-in-season produce, irrespective of geography and climate. Also presumed are ample supplies of dairy products, eggs and lean meat, as well as suitably

modulated and processed low-fat and fibre-enhanced options, mirroring the dominant, industrial food system and its institutions. Through omission, the ecological impacts of food choices, cooking and eating are rendered inconsequential. With permanent abundance only a feature of recent history in affluent societies, as food historian Massimo Montanari (1996) underscored, there is clearly a need for guidance but in this narrowed dietary discourse, human health is abstracted from ecological health.

With the exception of not cooking at all, cooking for health, or pleasure, or as a form of activism are not mutually exclusive. Cooking for health in particular can be pursued at the supermarket as noted, or equally at the farmers' market, or in some combination. Similarly, participation in alternative food networks can arise predominantly from activism, but also accommodate culinary priorities. For many however, alternative food is conducive to the enactment of cooking as an interwoven cultural, health-aware and ecologically literate activity. This is observable in the ascendance of school kitchen garden programs that integrate ecological principles, food growing, cooking, nutrition, eating as a social skill, and personal development arising from applied and inter-connected curricula (Yeatman *et al.*, 2013). Cooking and food practices can be understood perhaps as originating within the deep, pre-figuring structures of Bourdieu's (1977) *habitus*, while being simultaneously subject to the flux of social and political shifts, along with personal imperatives such as health, ethics and morality.

### Who decides what and how you cook?

Subscribing to ecological food principles and enacting cooking as the interwoven activity I describe above has significant implications for cooking skills and their application. Recalling the trenchant charge Cribb (2010) levelled against cookbooks (refer p. 43) and the profligate food culture set to rob future generations of sustenance, it is pertinent to question the forces that direct what we cook today. There remains, for example, a legacy of highly directed forms of cooking that derive from exalted cuisines such as the French recipes of *Larousse Gastronomique* first published in 1938. More persuasive and current, is the television chef on his or her latest odyssey abroad whose dishes we might hope to emulate, while blinkered to the demand created for a host of exotic ingredients freighted in from distant continents. Relentless cooking

direction also flows from the food industry marketeers who exhort us to post-process already processed foodstuffs by 'just adding', heating and serving. Reiterating that cooking is deemed to be highly contextual, ecological food principles suggest that *what* and *how* we cook are also inescapably grounded in social-ecological contexts.

Ecological food principles are enacted most readily, I contend, in Short's promotion of a 'process approach to cooking' (2006, pp. 115-116). Merging her conception with the ecological principles in Figure 5.1, transferable cooking skills underpin the ability to devise, improvise and adapt in response to seasonal produce, locally available ingredients, basic whole foods, and a small range of processed essentials such as oils and spices. The concept of food waste is minimised by the ability to make soups, stews and sauces, for example, and preserve surplus. This approach is exemplified by Pollan's skeleton recipe or 'syntax' for a stew, braise or soup:

Dice some aromatic plants  
Sauté them in some fat  
Brown piece(s) of meat (or other featured ingredient)  
Put everything in a pot  
Add some water (or stock, wine, milk, etc.)  
Simmer, below the boil for a long time (2013, p. 133).

Along with transferable cooking skills such as these, cooking as a process is contingent upon gaining knowledge of the properties and qualities of fresh and whole foods, their storage, and the potential pleasure and meaning derived from cooking, sharing and eating them.

Cooking as a process, including improvising with readily available fresh foods, by no means rejects the centuries-long shaping of traditional cuisines, their important craft skills, nor the diverse ethnic food cultures they reflect. The crucial role food performs in the maintenance and expression of ethnic identity within Australia's migrant communities underpins the richness of our food culture, as it does in many other multicultural settings (Timothy & Ron, 2013). In

terms of cooking practices however, a process approach is essential to the enactment of ecological food principles. This involves challenging established conventions, such as cooking titled dishes borrowed from other contexts strictly to recipes, and resisting the fads of foodie media. To care actively for the earth, Wendell Berry (2009) urged us to make a start in our homes, kitchens and eating places, as stated in Chapter 1. In constant interplay with our cooking practices are our kitchens, with their myriad material and spatial configurations. Kitchens are also entities brimming over with subjective meanings, so it is into the kitchen I venture next for the second social-ecological reading.

## 5.2 Kitchens, consumption, and the art of lifestyle

The typical suburban kitchen, provisioned weekly to balance budget, dietary needs and household members' food preferences, is an intensive site of consumption. Quite apart from the products and produce flowing in, and the packaging and food waste flowing out, it is a typical Australian kitchen where between twenty and thirty per cent of household energy is consumed (DCCEE, 2010, p. 2). The kitchen is materially intensive too, with its cabinetry, services and fittings worth \$2.79 billion nationally for new installations in 2011-2012 (HIA, 2013, p. 7), before it is populated with appliances large and small, accessories and gadgets, and set into operation. As with food choices and cooking practices, the drivers for, and nature of this kitchen-centred consumption need to be understood as arising from particular social and cultural conditions, which once examined, present a context to which the ecological design and ecological food principles can be applied.

The kitchen's significance extends far beyond consumption in metabolic terms, it being a primary domestic site where cultural practices and social relations are performed, as expressed by anthropologist Susan Freeman:

A kitchen ... is virtually everywhere a signal place where food is daily prepared but also a place of social interaction and, for children, socialization and enculturation. ... The culinary arts and aesthetic judgment are being taught, much of the household economy

managed, family life lived, and many larger parts of culture enacted, discussed and transmitted there (2006, p. 100).

Enlisting consumption theories to discern the source of dominant norms bound within contemporary kitchen design and household practices, I proceed mindful of potential linkages with householder values and identities. Noting Warde's commentary on the syncretic nature of consumption (2005, p. 137), the kitchen is both a highly differentiated commodity available for purchase *and* a suite of components to be used, in which energy, water, food, and eventually the materials and appliances are 'used up' and renewed. Consumption manifests only *in use* and the everyday operations of householders to de Certeau (1984), negotiated in space and time, in interplay with dominant economic forces. These are but two perspectives on consumption among myriad theories emanating from disciplines including sociology, behavioural psychology and economics.

A practice-framed view of consumption, such as that of Warde's (2005), positions individuals as shaping their consumption in tandem with the practices in which they engage, such as hobbies and cultural activities, including cooking and eating. Simultaneously, householders are subject to production forces and the interests of kitchen manufacturers and retailers in increasing demand for the kitchen and its vast array of accoutrements as commodities. Food media in turn, showcase the kitchen as a desirable commodity, while supermarkets and celebrities too partner in the generation of demand through mechanisms such as advertising within and sponsoring food media and endorsing products. Producers, as Warde (2005) observes, are actively and continuously seeding and purveying emergent practices. Making espresso at home with a countertop domestic machine is a case in point, supported by a proliferation of machine types available at a range of prices, spurring widespread adoption of the practice.

Echoing my discussion of food choices and provisioning practices in the preceding section, consumption patterns coalesce similarly within social collectivities, as sociologists June Freeman (2004) and Dale Southerton (2001)

demonstrated in their British studies of kitchen consumption. Differentiated uses of kitchens and the values attributed to them corresponded to comparative social groupings in the studies and their respective economic and cultural resources. Summarised in brief, those with fewer resources more often viewed the kitchen in pragmatic, functional terms deemed by participants as befitting of their own perceived social status, while the more affluent and educated accorded abstracted and symbolic meanings to the kitchen and the practices it enabled, such as the fulfilment of cooking as a passion, socialising and maintaining family values. Bourdieu's (1984) position on resource-contingent social differentiation, and its expressions, appears to be borne out to a large degree in these cases. Meanwhile, a Danish study of 13 households (Gram-Hanssen & Bech-Danielsen, 2004) suggested identities and meanings derived from the home were more nuanced, flagging the potential limits to transferability of Bourdieu's 1970s and 1980s French context observations.

### Kitchen renewal and what we buy in a kitchen

Intersecting various social collectivities, demanding both economic and cultural resources, and representing significant material consumption, are the practices of kitchen renewal. In Australia, approximately 145,900 kitchen renovations were anticipated for 2012-2013, the average value of each new installation in 2011-2012 being \$17,695 (Housing Industry Association, 2013, p. 7). Targeting a relatively affluent demographic, *The Weekend Australian* newspaper's lifestyle supplement quoted a designer's suggested price range of \$50,000 to \$80,000 for a 'very nice kitchen' (Higson, March 9-10, 2013). Kitchen (and bathroom) renovations are also being carried out more frequently than in the past (HIA, 2013). Referring to kitchen renewal 'churn rates', Hand and Shove suggested these are "driven by successive reinterpretations of what the kitchen 'is' and is 'for' and by the development of new meta-level visions of the kitchen into which previous models, activities, skills, and styles do not 'fit'" (2004, p. 238). The material quality of the kitchen is a further factor to which I return in Section 5.4.

In shopping hypothetically for a new kitchen, as I did recently over successive months, I was most overwhelmed by the marketing of the kitchen via a taxonomy of *styles*. Whether contemplating in-situ the display kitchens of global

retailer IKEA in Adelaide, mainstream hardware chain Beijer in regional Sweden, or exploring the websites of two prominent Australian kitchen manufacturers, Impala (Impala Kitchens & Bathrooms, 2014) and Kitchen Connection (Kitchen Connection, 2011), kitchen models are catalogued typically according to modern-traditional dichotomies and allusions to desirable regions and places, such as 'Bordeaux' and the 'Inner West' (of Sydney). Grievously, the latter supplier offers the 'Eco' option within its contemporary range. The 'Eco' appears to have acquired the appellation by virtue of the material used for its cupboard doors while its styling remains identical to a non-eco option, a key contention I develop in Section 5.4.

Reconsidering the ecological design principles and ecological food principles set out in Figure 5.1, relative to perspectives on consumption, some troubling patterns come to light. Foremost is the sheer volume of kitchen consumption given that renovations equal new kitchen installation estimates (HIA, 2013, p. 7), making for nearly 300,000 kitchens on an annual basis, constructed by an industry that is yet to mainstream ecologically sound materials and products. Kitchen renovations generate considerable waste destined for landfill because the composite materials, mostly amalgams of plastic, fibreboard and adhesives are difficult even to downcycle. In McDonough and Braungart's (2002, 2013) terms these 'technical nutrients' are both harmful and squandered forever. On the upside, kitchen renovations are likely to result in the installation of more energy efficient appliances and water conserving fittings resulting from new standards (DCCEE, 2010; Fielding *et al.*, 2010).

Complementing the appeals to style, kitchen marketing is replete with invitations to customise, personalise and express one's identity, by choosing an IKEA kitchen in this case:

Our designers have sharpened their pencils to create kitchen cabinets that suit your lifestyle. We have a large range of kitchen cabinet designs and finishes to allow you to bring out your inner stylist. ... [Y]ou can select your kitchen cabinets that reflect your unique personality. Choose from modern cabinets with a clean finish

to practical cabinets for the home chef who needs plenty of storage (Inter-IKEA Systems, 2013).

This priority in kitchen design results in a profusion of differentiated finishes, accessories and hardware, in the main produced with little heed to durability and longevity due to expectations of short-term repudiation and replacement. In the interests of balance, IKEA have toned down their promotion of superficial 'kitchen makeovers' and are now guaranteeing their core kitchen series for twenty-five years (Inter-IKEA Systems, 2013).

### Identity renewal and the many cooks in your kitchen

Consumers of kitchens are clearly purchasing far in excess of functional, material kitchens. Writing on the 'restlessness' of the kitchen, Shove, Watson, Hand and Ingram (2007) proposed the key driver of kitchen renewal to be the pursuit of idealised and normalised ways of living. In this act of renewal are the "dissatisfaction of the present, and an image of a better, or more appropriate future" (2007, p. 26), discussed through notions of 'having' and 'doing' which may not align even post-renovation. At IKEA once again, the mocked-up rooms and kitchens invite visitors "to try out different identities and speculatively experiment with new lifestyles" as Shove observed in earlier work (1999, p. 138). In popular discourses and visual culture centred on the home and kitchen, we are assaulted with imagery of idealised lifestyles, not least by the celebrity chefs and cooks who saturate food media. Urging what Ashley, Hollows, Jones and Taylor term "an investment in the art of everyday life" (2004, p. 183), celebrity chefs are deeply implicated in material consumption and insinuate their way into our kitchens, as I will demonstrate, with rippling ecological consequences.





Figure 5.2: Nigella Lawson teaching the 'art of lifestyle' in her television kitchen

Limiting this focus for the sake of brevity, to the prolific and enduring outputs of Jamie Oliver and Nigella Lawson, the kitchens of these familiar personas are bountiful and vibrant spaces with well-provisioned pantries and ample arrays of cookware and utensils. These settings have become, arguably, our benchmarks for what a kitchen *ought* to be, intimating desirable visions of contemporary domesticity in spatial-material terms, as Figure 5.2 suggests. In these contrived settings, 'normality' is recalibrated through the high fidelity imagery of the cook *having* and *doing*. The goal of such programs is no longer to teach basic how-to-cook skills as Ashley *et al.* assessed, instead "the audience ... is receiving an education in the 'art of lifestyle'. ... The transformation or makeover of the self as promised by these shows is significantly different to the traditional forms of moral improvement associated with Delia [Smith]" (2004, p. 184). Cooking remains bound within this 'art', and the competencies to be acquired are mirrored in the latest kitchen appliances that hybridise features of professional kitchens, such as double ovens, an array of gas burners, and griddle plates, along with ever-expanding dimensions and a distinct commercial aesthetic.

Conjecture on the influence of these lifestyle beacons could be endless, but they are succeeding in becoming materially embedded in the kitchens of their followers. In addition to cookbook publications and DVDs, both Jamie and Nigella (for we 'know' them on first name terms) make available licensed,

branded cookware ranges in a host of countries (jamieoliver.com, n.d.; nigella.com, 2014a). Jamie's frozen food options could find their way into your freezer, and he can be invoked partially through purchase of a Jamie Oliver Home Cooker and Cutter Tower. In fairness, this semi-automated device may enable cooking in the micro-kitchens of city apartments and student residences that otherwise privilege pot noodles and microwaveable fare. He is also a vocal advocate for improved nutrition for children and has embedded cooking education within social justice initiatives.

In Nigella's 'kitchen kit' ranges, each item is prefaced by a personalised quote explaining the need for such a gadget or cookware item, perhaps her dissatisfaction with existing gadgets, and some affective commentary. Not even humble measuring spoons escaped this treatment: "I have got any number of measuring spoons that do the job, but they all look clunky and no more than serviceable. I wanted to have measuring spoons that were also beautiful, following the elegant lines of Georgian cutlery" (nigella.com, 2014b).

Suspended are any popular sustainability concerns, and design is harnessed for extreme product differentiation, coaxing us to favour Nigella's preferences, which may well be superior ergonomically in some cases. Borrowing from anthropologist Sidney Mintz's (1996) explorations of identity and food, Nigella's marketing appeals to "the consumer who creates cultural forms by which to live and then discards them in order to create new ones" (1996, p. 82). Coupled with her actual recipes, Nigella operates in a rarefied realm of plenty, or more critically, a grossly resource intensive and ecologically-blind bubble of excess.

### The food and lifestyle media behemoth

Globalised lifestyle media encompassing cooking programs, food odysseys and home (and self) renewal genres, pose a mighty counterforce to the ascendance of ecologically literate household practices. My final examples, in which the kitchen has been re-cast as a site of flamboyant conquest and theatre, are most confounding. Complicit here, for example, is the *MasterChef* (MasterChef, n.d.) global franchise and the *Great British Bake-off* (BBC, 2012), formats in which kitchens become fraught sites of competition and attrition. Exempted from material restraint and dietary guidelines, these too are realms of plenty, where exalted arbiters reject food and competitors' imperfect attempts are belittled.

Food waste and result-orientations are normalised in these settings, undermining the valuing of cooking as a resourceful, everyday process. These excesses are only surpassed by revered British gastronomist, Heston Blumenthal, whose recent program *Heston's Fantastical Food* (Channel 4, 2014) uses food as the stuff of gratuitous, super-sized spectacle. Food is no longer for sustenance or even for culinary pleasure, with its availability and value re-framed in a perpetual and ephemeral antinomy.

Within this fanciful forcefield, the kitchen has become subsumed and embedded as a highly fetishised imaginary, simultaneously proliferating materially into ever more nuanced components that we are exhorted to 'need'. The project of re-visioning the kitchen as ecological infrastructure is constrained profoundly by this social-cultural behemoth. There are however, broadcaster-activists who are countering the flow while using similar channels to disseminate their messages. Briton Hugh Fearnley-Whittingstall is one such exponent, while in North America prominent authors including Barbara Kingsolver and Michael Pollan are also wielding their keyboards and social media sites. Curiously, the kitchens in which we meet these activists often belong to eras past and eschew a good deal of the contemporary kitchen imagery scrutinised above. This connection with the spatial-material past life of the kitchen is an instructive lead, I suggest, and is explored in the next section.

### 5.3 Past lives of the kitchen

Since the late 1990s I have tracked the progress of Hugh Fearnley-Whittingstall from four different vantage points in Europe and Australasia, all reached by his broadcasts. As the focus shifted from his own experience of rejecting urban life and taking up rural self-provisioning, to challenging the dominant practices of factory farming, and then engaging urban dwellers with the provenance and production of their food, his messages became increasingly resonant and urgent. Fearnley-Whittingstall's celebrity and ethical consumption advocacy have drawn the attention of food culture scholars, with David Bell and Joanne Hollows (2011) describing his genre shift from 'downshifting' narrative to the 'culinary campaigning documentary'. By the time I made a pilgrimage to River Cottage in September 2010 on a scoping visit for this study, 'River Cottage' had

become an ethos, a sizeable brand, and a destination. The spatial and material manifestation of this ideology particularly piqued my interest, mindful that River Cottage headquarters had long been a working farm, and additionally now a centre of learning and hub for convivial events. Below I recount my impressions of the first half-day of four days spent cooking at River Cottage:

*After an intensive morning at our workstations in the restored barn, we crossed the gravel yard to the farmhouse, each bearing a plated first course salad. Stooping under the oak lintel dividing entry hall from dining room, we are presented with a long refectory table simply, but elegantly laid for eighteen. Soon we are seated and tucking into just-baked bread and the tasty outcome of our first cooking lesson. I berate myself for sitting with my back to the south-facing windows which frame the kitchen garden, now in its slightly overblown early autumn flourish. After a further course and a little dessert of raspberries and house-made yogurt, we cross the age-worn flagstones into the original scullery to stack our crockery. At once this room is familiar; the sensation is heady. Here at the scrubbed timber table, backed by the hearth and cooking range, Hugh Fearnley-Whittingstall has cooked, sought guidance from his own mentors and engaged us in dialogue about sustainable food. I am standing in the farmhouse television set from which his messages and provocations have been delivered across the world.*



Figure 5.3: The Park Farm farmhouse overlooking its south-facing kitchen garden

Park Farm located in Devon, England, is the material manifestation of the River Cottage phenomenon. Its thousands of visitors are not met however, with an eighteenth-century farmhouse frozen nostalgically in time, though its patina is well-expressed and charm palpable (Figure 5.3). Upon approach, the wind turbine comes first into view, and visitors become acquainted progressively with the solar energy system, the reed beds for water cycling, the capacious kitchen composter and the biomass boiler providing heating. Park Farm is an overt model working toward a zero carbon target, locating food and cooking within integrated renewable energy, water and nutrient systems, and coupled with a firm commitment to social outcomes. The past lives of Park Farm, and its kitchen, have been brought firmly into the present in an innovative hybrid form.

Even without such interventions, kitchens and foodways of the past and the social and cultural conditions out of which they arose have much to contribute to this analysis. I take the lead of John Ruskin, who sociologist Richard Sennett

characterised as one who “refuses the present, [and] looks backward in order to look forward” (2008, p. 114). My intention in this section is not to retrace the entire history of the kitchen, with accounts already undertaken by a range of scholars (for example, Bullock, 1988; Cieraad, 2002; Collins Cromley, 2010; Freeman, 2004; Mielke, 2005; Steel, 2009), complemented by those appealing to popular interest (Bryson, 2010; Worsley, 2011). Rather, I illuminate four nodes along the kitchen’s trajectory from the rudimentary pre-industrial through to its contemporary, increasingly symbolic forms. Resulting from my pre-study scoping visits, literature review and reflection, I have judged each node to represent a key shift or moment contributing to the kitchen’s ecological disconnection. Reading the four nodes through the lenses of ecological design and ecological food principles, I am concurrently seeking opportunities for ecological reconnection, as research *for*, and *through* design in Phases 2 and 3 of the study.

### Node 1: The pre-industrial food axis

The food axis proposed by Elizabeth Collins Cromley (2010), introduced and defined in Chapters 1, 2 and 4, offers a compelling analytical tool in its embrace of related food provisioning, cooking and eating elements and their dynamics, in preference to rooms and room names which have shifted greatly over time. “[T]he food axis implies a network of related spaces above and below ground, both attached to the house and separate from it, described in architectural plan and in cross-section” (2010, p. 2). Consideration of pre-industrial kitchens (which I define largely as those predating fitted, fully-serviced kitchens yet mindful of transitional forms) emphasises connections between spatial layout, vernacular house forms and essential sources of fuel, water and provisions, the expulsion of wastes, along with the role of productive lands and animals. The food axis allows for mapping the full range of activities to which kitchens were linked inextricably and is therefore highly compatible with a social-ecological orientation to design.





Figure 5.4: The kitchen hearth at Runnymede adjoining the scullery, both opening to the courtyard

Exemplifying a pre-industrial food axis is the well-conserved Georgian house, Runnymede, built in 1840 on the outskirts of Hobart for a Scottish lawyer. The rear of the house is configured around a central cobbled courtyard where many food preparation activities occurred and waste was dispatched. The kitchen comprises a room with hearth and central work table proximal to the hall and dining room, adjoining a scullery as shown in Figure 5.4, both opening to the yard.



Figure 5.5: The courtyard at Runnymede with cellar and dairy to the left, on the southern side, opposite the kitchen and scullery

Opposite, a stairway descends to the cellar where barrels were stored, flanked by the former dairy, with these spaces located on the cooler, southern side of the house. Immediately beyond the courtyard in Figure 5.5, a kitchen garden was formerly tended, giving way to outbuildings including the stables and coach house. Noteworthy in this historic food axis and common to so many, is the *disaggregated* nature of the food spaces and functions contrasted with highly consolidated contemporary kitchens. This ordering was both immensely practical given the arduous and visceral nature of provisioning and cooking in the 1800s, and reflected social mores that distanced servants, their work and workspaces from the finer, public spaces of such homes of the affluent.

The necessity for the kitchen, its functions and indeed its servants to be out of sight (and smell) of the gentility and middle classes has influenced house form profoundly, as Alexander, Ishikawa and Silverstein (1977) and Cieraad (2002) in particular have discussed. Despite radical transformations to the kitchen during the twentieth century, and the social elevation and subsequent feminist dismantling of the 'housewife', the entrenchment of women as servants was to persist while ever the kitchen remained separate, in the view of Alexander, Ishikawa and Silverstein in *A Pattern Language* (1977). This could be remedied only by the design pattern they proposed termed the 'farmhouse kitchen', in



which “all the members of the family are able to accept, fully, the fact that taking care of themselves by *cooking* is as much a part of life as taking care of themselves by *eating*” (1977, p. 662). In this statement, cooking as a responsible, shared process in a multi-use kitchen hub, the ethos of school kitchen gardens and the social exertions of Jamie Oliver curiously coalesce. The ecological design conundrum posed is how to foster such domestic citizenship, with responses yet to emerge in Chapters 6 and 7.

Inhabiting a farmhouse kitchen set within the remnants of a pre-industrial food axis, does not mesh neatly with the enactment of contemporary, ecological food principles however, as these narrative accounts attest. Barbara Kingsolver and her family described peak harvest time at their Appalachian smallholding:

By mid-August tomatoes covered the countertops end-to-end, from the front edge to the backsplash. No place to set down a dirty dish, forget it, and no place to wash it, either. The sink stayed full of red orbs bobbing in their wash water. The stovetop stayed covered with baking sheets of halved tomatoes waiting for their turn in the oven. The cutting board stayed full, the knives kept slicing (Kingsolver, 2008, p. 198).

Those who have attempted to grow their own food and store it away at its best may recognise themselves in scenes akin to Kingsolver’s vivid imagery. Australian slow food advocate David Foster has experienced similar challenges living at the Southern Highlands farmhouse he shares with wife, Gerda:

I’ve tried keeping spuds in sacks in a spare bedroom, surrounding them in straw, or leaving them in the ground. ... Under the house in a metal bath, up against the stone wall, is as cool and dark a spot as I have, but it’s not particularly cool or particularly dry at present. There are sixty-five kilos in the bath ... four times the weight I planted (Foster & Foster, 2002, p. 160).

The questions posed by the very concept of the food axis and experiential accounts such as these are pertinent to ecological design; identifying what works for householders inhabiting pre-industrial settings is as valuable as highlighting what does not. Arguably, they may symbolise a rejection of modernity and the industrial food system more effectively than they support ecological food practices. In contemporary life without servants or staff, such as the Runnymede food axis depended upon and River Cottage still depends upon, the activities of producing, preserving and storing food at home generate intense interaction between householders and their domestic space – indoors, outdoors and in the liminal spaces connecting them.

## Node 2: Survival imperatives as the genesis of food cultures

The second node through which I connect the kitchen's past with matters ecological – the intractable coupling between provisioning imperatives for survival and food culture – is difficult to distinguish as a moment in time. The dissolution of this imperative due to trade, the growth of commercial suppliers and delivery networks, and eventually industrial-scale food production and technology occurred at different times and rates in different places. The necessity for food to be produced at the scale of the home and locality shaped the life of settlements and vernacular buildings for thousands of years, with geographic, topographic and climatic affordances of a given place determining largely what its inhabitants ate. Ecological food principles revive this essential connection given that food production becomes primarily re-localised and embedded within homescapes, communities and regions, as I established in Chapter 2.

With enduring pre-industrial homes and kitchens offering a valuable cultural heritage resource, I set out to investigate the kinds of foods that were cellared, dried in attics, tempered in dairies and crafted in bakehouses, with an eye to the low energy preservation methods that rendered foods edible after prolonged storage. Given its proximity to the Arctic, long winters and relatively late industrialisation, Scandinavia presented an obvious case where the necessity for self-provisioning had been utterly crucial, and where a revival in traditional foodways was being supported actively by state and European institutions. The opportunity presented to explore the food axes of farmsteads recently listed for

World Heritage in the mid-Swedish province of Hälsingland (Göllas, Lööv & Kristofers, 2012), was one to be seized. In this verdant rural setting, even family homes less noteworthy than the World Heritage farmsteads, such as eighteenth century Torslund, have much to reveal upon visiting firsthand as I did in the northern autumn of 2013:

*Cautioning to mind my head as we descend the pine stair to the cellar, Ivor, longtime owner of Torslund, is taking me on a tour of discovery. The air grows cooler and sweeter as we near the bottom, without a hint of the mustiness I expected. A few steps from the last tread a large freezer stands, freshly replenished with homegrown vegetables and foraged berries to last the winter and spring. Opposite are shelves bearing jars of fruit compotes and purees, dried mushrooms, pickled herrings and Torslund honey. Underfoot is gravel, Ivor explains, to diffuse the earth's warmth and maintain an ideal two degrees centigrade throughout the sub-zero winter. Around to the left and under an impressive stone, barrel-vaulted ceiling are crates stacked upon pallets. Inside, buried in sand are root vegetables. And awaiting the potato harvest is an empty wireframe bin yet to be lined with a paper sack and filled. I am intrigued by the bundled birch twigs resting at the perimeters, and learn how these help modulate the cellar's humidity. Squirrelled under this lofty house are many of the core components of a food culture I have come to know so well over a decade, coaxed from Torslund's land and gleaned from the surrounding forests.*

My experience of Torslund highlights the extent to which the cellar served as a capacious pantry, a literal foundation to the house, and the destination of provisioning routes from the kitchen and yard, and forests and lakes beyond. The recent revival of traditional food cultures in Sweden has prompted renewed interest in the use of earth cellars. This has translated into growing demand for the know-how required to restore existing cellars and build new ones (Öfverman, 2013), underscoring the link between traditional food practices, food spaces, and the knowledge and skills bound within them.

### Node 3: The kitchen's new mobility

In the kitchen's transformational path however, it became mobile or at least untethered from cellars, porches, lean-to's, yards and outbuildings. This rupture

is the third node I focus upon, and one enabled primarily by the installation of household services to supply electricity, gas, water and to expel waste. As with the preceding node, this major shift is similarly difficult to fix upon a timeline, and is perhaps better understood in terms of a 'regime change'. Hand and Shove explain this concept as an interaction of three composite elements: material arrangements and technologies; meanings and images; and skills, competences and forms of know-how, successively appropriated according to meta-level concepts of the kitchen (2004, pp. 247-248). Indirectly, Bullock (1988) and Cieraad (2002) identify the ascent of step-saving, 'efficiency kitchens' from the early to mid twentieth century as coinciding with the kitchen gaining this spatial mobility, reinforced by the advent of open plan interiors. The kitchen could now be located quite literally at the heart of the home if desired.

Prior to the 1950s and 1960s, the kitchen for most working class people in Britain and Australia took on various forms of rudimentary scullery and larder. Within some contexts, including the tenements of North America, there were no recognisable kitchens; food preparation was an improvised activity occurring in the main living space. Earlier social reform movements in several countries had succeeded in upgrading sanitary conditions in housing and assigning the kitchen a cooking-only function in the process, but the rudimentary configurations persisted in many impoverished places and within older housing stock. The rudimentary can still be observed in culturally diverse vernacular housing, with important refinements such as the wet and dry kitchens of Malaysia and Thailand that Papanek attributed to "hierarchical precedents, social patterns, as well as hygienic and climatic factors" (1995, p. 128). In common with the pre-industrial cases I have discussed, such food axes are also instructive for ecological design given the process-oriented food practices of less industrialised societies.

While the kitchen was becoming increasingly consolidated, efficient and sanitary, the natural elements with which its users had interacted for centuries were progressively distanced. Geographer and architect Maria Kaika (2004) traced the 'disappearance' of these elements into the fabric of the modern home, foregrounding how technology has assisted in disconnecting us from the environment: "Unwelcome social and natural elements (from sewage to

homelessness) were exiled underneath or outside the modern home, below the streets and inside the walls ... sent to a domain separate to that of the dwelling places of the modern individual" (Kaika, 2004, p. 273). The invisibility of sustaining elements more broadly within consolidated urban form, coupled with the distancing of our food supply have served to quarantine the untethered contemporary kitchen from the essential systems beyond.

In Australia in recent years, this taken-for-granted household automation has become more visible due to the sting of energy price hikes, water metering, rising waste removal charges and incentives for installing renewable energy technologies and insulation. Arguably, these factors are provoking the popular consciousness, and even if the motivations of householders might depend more upon economic and comfort drivers, from an ecological design perspective there exists the potential to align multiple imperatives, as Robyn Dowling and Emma Power (2011) highlight in their study linking 'homeliness' with sustainability in the 'McMansions' of outer Sydney.

#### Node 4: The commodity kitchen

My fourth and final focus in this section is the point at which the kitchen became a commodity, the manner in which it became replicable and the social and ecological significance of this development. Foreshadowed by the production of the coordinated, white Poggenpohl freestanding units in 1923 and more affordable electric appliances such as Siemen's 1926 'people's stove' (Mielke, 2005, pp. 15-17), the untethering of the kitchen discussed in the previous node was crucial to the kitchen becoming an object of exchange. Drawing on the work of fellow anthropologist Igor Kopytoff, Arjun Appadurai (1986) proposed that things have 'careers' and enter in and out of 'commodity phases', emerging from 'commodity contexts' in which knowledge confers value and demand. In my earlier discussion of consumption, I underscored the extent to which this phase grips us, given the amount expended on new kitchens and renovations, and the proliferation of associated commodities and lifestyles.

The efficiency- and technology-driven compaction of the kitchen leading up to the Second World War surely assisted this 'career shift', with the most (in)famous kitchen of all, the 'Frankfurt kitchen' presenting one of the first cases

of mass replication. Designed by Austrian architect Grete Schütte-Lihotsky, variants of this small, ultra-rational, cooking-only kitchen were deployed in 10,000 social housing dwellings between 1926-1930 (Freeman, 2004, p. 41). Freeman also reported that Lihotsky possessed a lifelong disinterest in cooking. In a thread leading to the present and for ostensible motives other than social reform, IKEA's replicated flat-pack kitchens can now be dispatched similarly to a host of countries, irrespective of the foodways and cultural practices of these far-flung places.

I can only speculate as to the impact of such commodity kitchens at their destinations, but relevant is Appadurai's comment that "[c]ommodities represent very complex social forms and distributions of knowledge. ... The production knowledge that is read into a commodity is quite different from the consumption knowledge that is read from the commodity" (1986, p. 41). In my assessment, Lihotsky's kitchen represented the production knowledge of social reform, but also the will and utopian design proclivities of an individual in a position of relative power, inflicted upon thousands who through social circumstance, were consumers without choice. I do not doubt however, that the kitchens likely provided enhanced material and sanitary conditions to their recipients in the historical context of the inter-war Weimar Republic.

In a contemporary parallel with great significance for ecological design, the growing numbers of urban dwellers inhabiting investment properties and off-the-plan, multi-dwelling developments are similarly recipients of pre-determined kitchens and the production knowledge imperatives of developers, centred on profit. Personalisation and customisation, as urged by kitchen retailers, are not to be enjoyed by all. Given decisions about appliance types and fittings are typically made at project level, energy and water consumption, and how waste is to be handled, are largely pre-set in such kitchens. Householders are limited in what they can affect materially and spatially, and household practices such as composting and waste sorting, are often difficult to enact unless designed in. Along the path traced by the four nodes above – from disaggregated pre-industrial food axes, traditional food cultures expressed via food spaces, to the kitchen's mobility and current commodity phase – the kitchen has become a compacted artefact utterly contingent upon services and infrastructures beyond

the home. In order for ecological design to privilege ecological food practices, the kitchen's commodity phase is subject to challenge. Approaches to 'greening' the kitchen and activating its ecological agency are therefore at the core of the final social-ecological reading below.

## 5.4 'Greening' the kitchen: Counterparts and ecological agents

Moving into the present and considering the ways in which the kitchen is subject to 'greening', it is of value to reflect once more upon its contemporary status. Throughout this section, I employ the terms 'green' and 'greening' in acknowledgement of their pervasive usage in popular discourses of the home and lifestyle, and dually for the purpose of unpacking meanings and the implications of these ubiquitous labels. 'Greening' agendas directed at the scale of the home, suburbs and cities have been underway for several decades with shifting emphases, as I elaborated in Chapters 1 and 2. At the scale of the home, the kitchen form along with the food practices explored in Section 5.1, are seemingly quite *resistant* to 'greening' agendas beyond cost sensitive issues such as energy and water consumption, despite the rates of kitchen renewal. The reasons for this I venture, are bound within its embedded social significance and the co-determining technical drivers of its contemporary forms. Like so much of our food, kitchens too are largely industrial confections.

Kitchens are now commonly centralised within social space in the home, often linking with outdoor living areas in detached housing, and ordering social space itself in apartment buildings due to the kitchen's typical coupling to the service core. Indeed, the kitchen's firm role within social space may explain an observable shift in the logic of kitchen design from functional workspace to 'furniture', with flush door panels and drawers sleekly concealing the kitchen's functions. The materiality of surfaces, coherence of lines and form, and coordinated appliances are often privileged in design. Given the combined financial and stylistic investment the kitchen represents, it may well set the stylistic tone for the adjoining living areas of the home in which it is anchored. This creates a functional tension which Collins Cromley captured with clarity:

"Today's kitchen, merged with social space, has lost the ability to separate the raw materials from their cultural final product, so kitchen dirt, noise, or smells and the refinements of the meal are conflated in space" (2010, p. 8).

The kitchen's very construction attests to its aesthetic credentials having become paramount; the under-framing carcass is manufactured in readiness to receive its stylistic 'skin' as trends dictate, in the form of doors, drawer fronts, handles and bench tops. Beneath the skin, the carcass joinery is made of reconstituted wood waste and glues, most of which still emit harmful volatile organic compounds (VOCs) into the air, encased in a melamine plastic coating. Of variable quality, these board products can be vulnerable to damage if the surfaces are exposed to impact, excessive heat or are breached by liquids. Mass production and cost-efficiency have consequently robbed the contemporary kitchen of the robustness inherent in earlier kitchen forms based on materials such as wood, stone, earth and metals. Yet the kitchen renewal industry and indeed the identity renewal industries, now rely upon this relatively short life expectancy, as observed earlier. In a countermove, IKEA's recent instatement of the twenty-five year kitchen guarantee could be interpreted as a significant 'greening' development on the counts of product longevity and a recalibrated consumption message to potential customers.

'Green' and 'eco' kitchen artefacts are filtering into mainstream markets and represented through a range of appeals to consumers, such as 'doing one's bit for the environment' and the ability to balance lifestyle with environmental concern. In scrutinising the kitchen's 'greening' with a critical perspective, my analysis is aided greatly by material agency theories and the conceptual toolset they offer, as discussed in regard to methodology in the previous chapter. Drawing on Pickering's (2010) thinking, it is pertinent to question the progenitors' intentions for these artefacts, and the potential agency seeded within the design and manufacture of the wave of 'green' wares. Mindful of the marketers' 'green-washing' used to woo the public through mere appeals to these labels, I propose a firm distinction between artefacts serving as *counterparts* for their non-green versions, and *ecological agents* which seek to challenge the *status quo* or initiate ecologically literate practices.



Counterparts typically claim a ‘green’ or ‘eco’ appellation through reduced energy use, material credentials and component recyclability, but they do not seek to disrupt existing practices and therefore serve to reify the *status quo*. In the kitchen, these artefacts endorse, for example, the pursuit of highly aestheticised, furniture-like forms, the ownership of an array of specialised electrical appliances, and the assemblage of meals from packaged and frozen, ready-made components. Low VOC emission laminates and supermarket meal kits can still perform their perfect dialectical match, gentle on the kitchen joinery as the latter are, as well as convenient for consumers with their busy lifestyles. In a related perspective, Elizabeth Shove concluded her study of comfort, cleanliness and convenience in relation to sustainability by suggesting that “[r]ather than promoting energy and resource-efficient versions of products and technologies that inadvertently sustain unsustainable concepts of service, environmentalists should argue for social and cultural diversity” (2003, p. 199).

Contending that ‘normality’ is in fact highly malleable, Shove (2003) promoted diverse meanings and conventions in daily consumption as the means of challenging what she foresaw as a cross-cultural convergence and ‘locking in’ of ecologically degrading practices. This links with the divergent second category I propose, comprising artefacts arising out of, inviting or prompting alternate practices as agents of ecological literacy (Orr, 2002; Holm, Søndergård & Hansen, 2010).

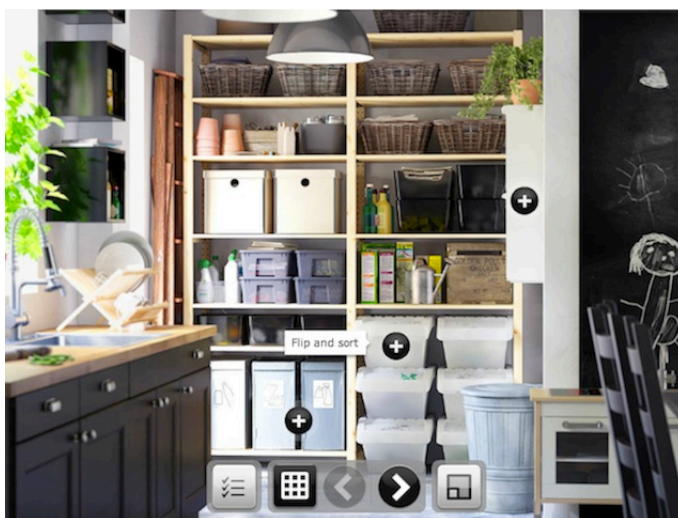


Figure 5.6: IKEA kitchen with adjacent waste sorting storage and suggestion of small-scale gardening practices

I employ 'ecological agency' in this context as a targeted refinement of the concept of material agency introduced in Chapter 4, mindful of use of the term 'ecological agent' in the biological sciences. Among such artefacts are those facilitating waste minimisation and recycling, composting, making practices, and the sourcing and storing of non-packaged, bulk and lower embodied energy foods, as per the ecological food principles in Figure 5.1. This notion, and the associated practices were intimated on the IKEA website in 2012, as shown in Figure 5.6. This somewhat aberrant IKEA illustration is significant for including a space adjacent to the kitchen for waste sorting, storage for recycling, and for easy access to small-scale gardening equipment, suggestive of proximity to some form of garden that could involve food growing, and composting of organic waste. The sorting and recycling bins are purpose-designed to overtly facilitate the practice of recycling, such that the practice is *validated* through design of the material components and their visibility. In this scene the kitchen is permitted to be lived-in and imperfect, hinting at the re-emergence of the kitchen as integral to other regenerative systems and practices beyond the kitchen's walls.

### 'Greening' to maintain the *status quo*

The counterpart approach to 'greening' the kitchen however, is on the whole far more pervasive. In showcasing 'Australia's greenest kitchens' in a 2011 issue of sustainable design magazine *Sanctuary* (ATA, 2011, pp. 46-82), only three minor references were made to kitchen practices and consumption: planning for bulk-buying and storing staples in order to reduce waste, planning for recycling and composting, and growing salad and herbs. Through seventeen examples and expert guidance the focus was squarely upon the environmental credentials of materials and appliances, and to a lesser extent on re-use of materials. Significantly, the kitchens were visually indistinguishable from kitchens reflecting the *status quo*, and their designs did not seek to facilitate the adoption of more ecologically literate household practices, nor foster the agency of users motivated to enact them.

Two years hence, competitor publication *green* remains staunch in upholding aesthetic ideals in the nine kitchens featured for its annual review. Stylistic purity is privileged utterly along with material credentials, and any kitchen

paraphernalia belying the kitchens' daily functions have been banished wholly from the images (O'Neill, 2013, pp. 34-40). The representations reflect both a preoccupation with architectural form and materiality, and the narrow 'technical sustainability' Guy (2010) contended was limiting to sustainable design. This narrowed focus is reinforced further by the materials specification focus of well-intentioned resources targeting professional designers such as the *Eco Priority Guide: Kitchens* (Ecospecifier, 2013).



Figure 5.7: Electrolux 'Switch up to a greener lifestyle' website

The discourse around green kitchen counterparts also suggests that their agency is sufficiently potent for the materials, appliances and products to take care of being green *for* the consumer. Highlighted on the Electrolux *Switch Up to a Greener Lifestyle* web page (captured in Figure 5.7) is that "some ways of becoming more eco-efficient are easier than others" (Electrolux, n.d.). It is discernible in both the case of the 'green' kitchen feature and the Electrolux appliance range that one can exchange a non-green appliance, product or kitchen material for a 'green' version, without disruption to one's lifestyle or habits. Apart from maintaining consumer demand for new products, the implication is that existing practices in the kitchen such as supermarket provisioning, cooking like Heston Blumenthal, acquiring yet more kitchen gadgets and resource-intensive lifestyles more generally, may go unchallenged.

Fridges and freezers remain capacious and energy hungry, and the socially symbolic kitchen is permitted to remain aesthetically intact.

### Limits to material agency and the value conflicts of humans

Within these contrasting 'greening' pathways are two key hurdles demanding recognition, and they occur within the transactional 'dance' between human and material agency that Pickering (2010) characterised. The first is the inherent limitation to the agency of material and spatial artefacts, even if designed as ecological agents. They can only invite or promote alternate practices, but as Tilley noted, they cannot achieve directive primacy (2001, p. 261). Only householders can adopt and enact the practices so targeted. An understated Australian example addressing the need for such bridging at the scale of cooking practices, was Giselle Wilkinson's book *The Conscious Cook* (2008), which sought to help readers evaluate the ecological consequences of their food choices integral to offering healthy, flexible and achievable recipes. This example highlights that even our normalised taste preferences are implicated in this much bigger picture, as we have become inured to eating food pre-prepared, 'fridge cold' and out of season as Mielke (2005) lamented.

The second, and particularly daunting hurdle I identify, recognises that barriers to the adoption of ecologically aware household practices are numerous. This is foregrounded in the studies of sociologist David Evans (2011), and psychologist Birgitta Gatersleben (2010) and colleagues, both of which address sustainability, consumption and lifestyles broadly but from distinct theoretical perspectives. Evans proposed that differing social conventions are accorded levels of worth such that the nascent convention of 'ecological citizenship' can be readily out-valued. In practice, being a good parent or keeping up with the latest technologies could well take precedence even for motivated, ecologically aware householders. This connects with the conclusion of Gatersleben *et al.* who did not find "that people who expressed high environmental concern were necessarily less materialistic and vice versa" (2010, p. 47). These two studies, among many, highlight the existence of substantial value conflicts for householders and the difficulty in defining the kinds of household practices for future ecological agents to target.

With these value conflicts in mind, it is unsurprising that the dominant 'greening' discourse centred on the home frames material consumption and 'going green' as quite compatible, in a re-working of the 'having and doing' dynamic characterised by Shove *et al.* (2007). The kitchen, whether 'greened' to some degree or not, remains an intensive site of material and resource consumption and a hub for household practices, perhaps best understood as a site of complex contradictions, to draw on anthropologist Daniel Miller's observations in *Stuff* (2010). Householders motivated by a growing ecological awareness can be engaged in actively eschewing proscribed forms of consumption, while simultaneously adopting other emergent forms of having and doing. Greening tied to the logic of capital, as Fry (2009), and Cook and Swyngedouw (2012) insisted, is largely impotent in effecting genuine social-ecological benefit, especially in the relatively affluent West.

## 5.5 Conclusion

Through the four themed social-ecological readings, this analysis has underscored that contemporary kitchens are not only indivisible from intensive consumption, but are in fact distributed nodes in the vast networks of global industrial food, manufacturing and media institutions. I have also revealed the kitchen is not one, but multiple products of design simultaneously, structured by, and structuring popular cultural activities and practices. In response to the first research question, these highly consequential connections between food and housing, and ecological conditions position dominant domestic design as a persistent legacy of modernity and the logic of capital. Household practices in turn, such as provisioning, cooking and eating, are interwoven into a range of imperatives including health, the negotiation of social disadvantage, identity and personal politics. The powerful institutions controlling food supply and food culture in the main manipulate food choices, what constitutes cooking, what we eat and what 'stuff' we add to our domestic stockpiles, reifying ecologically degrading household practices that have been normalised over decades. By extension, attempts to 'green' the kitchen without disruption to the *status quo* perpetuate market-driven consumption and by reinforcing current contingencies, undermine our collective resilience.

In parallel, the contemporary kitchen still performs a crucial and positive role in supporting social relations, food and cooking knowledge and skills, and food-related community development. These roles highlight opportune areas to engage with and foster in this social-ecological design research. Food policy, public health, education, and existing sustainability agendas are all relevant platforms to leverage. There exists too potential to 'mine' further the pre-industrial food axes of the past for guidance on spatial-material and functional affordances, low energy food preservation methods and regenerative cycles. The outcomes of this social-ecological analysis help to define the problems of research for, and through design in Phases 2 and 3: re-visioning the meta-level concept of the kitchen, and dismantling its commodity phase in favour of the kitchen and garden as ecological agent. In Phase 2, I turn to the social collectivities already engaging in ecologically literate household practices to guide a practice-led re-visioning. This leads to my involvement with 12 Tasmanian households whose generous inhabitants committed to assisting me to this end, as I elaborate fully in the following chapter.

## Inside the everyday: Participatory outcomes

### 6.o Introduction

In focus in this chapter are the participatory outcomes of Phases 2 and 3 of the research design, comprising my ethnographic participation within 12 Tasmanian food-producing households and three design workshops involving a wider network of participants. I reiterate first the relationship between the two phases, with the household visits taking place between February and April 2013 during the primary harvest season, and the workshops staged in July and November of the same year. The household settings are profiled with food-related practices analysed in relation to spatial-material concerns that emphasise the kitchen-garden interface. This offers finer-grained insights into the everyday experiences of food producing as the interwoven set of social and cultural activities I characterised in the preceding chapter. The workshop outcomes are then presented, featuring participants' speculative, 'what might be' design responses spanning scales from the communal through to the dwelling and kitchen. I conclude this chapter with a meta-level design brief that guides the regenerative food axis design patterns I propose in Chapter 7.

The purpose of the second phase household ethnography, detailed in Chapter 4, was to experience and identify practices associated with home-based food production *from the inside*, achieved by co-engaging in the practices of householders as far as possible. This enabled critical observation of

participants' interactions with their home environment, and particularly the existing spatial, material and functional interfaces between kitchens and gardens as the manifestation of contemporary food axes. The analysis to follow in Section 6.2 proceeds with particular sensitivity to issues of scale relative to ecological systems, the role of tenure, and the social significance of food gardens in daily life. My involvement with each household lasted between a half and full day, preceded by and in some cases followed by email contact, with visits made according to householder availability. These visits involved me in a variety of activities: harvesting, weeding, discussing approaches and systems while exploring gardens, chasing chickens, and drinking tea while discussing participants' kitchens, in-situ.

Reiterating the purpose of the third phase design workshops, these were intended to generate speculative design responses to the overarching question: **'how might dwelling and garden space be designed to best support regenerative growing and producing practices?'** Foremost, the workshops demonstrated the experiential knowledge of participants and invited them to reflect upon what was aligning with their practices in the home environment, as well as identifying dilemmas arising from environmental, spatial, and personal and social factors that could inform the re-visioning of productive domestic space. The workshop analysis in Section 6.4 is most concerned with spatial and social speculations, with a primary goal of informing ecological design. Equally, the workshops offered participants a convivial knowledge sharing and learning opportunity, in line with my value of reciprocity.

## 6.1 Overview of Phase 2 and 3 methods and participation

Invitation to participate in Phases 2 and 3 of the study, as outlined in Sections 4.4 and 4.5, was made through sustainable living and alternative food networks via email and social media. I set out the range of housing types and densities I sought, and specified involvement in food production with a commitment to sustainable approaches. Offers to participate were only politely declined as a result of an excess of rural category settings. Phase 3 workshop participants were similarly invited, with some Phase 2 participants choosing to distribute my invitation via word-of-mouth. All participants who expressed interest attended



one of the three workshops; therefore no one was excluded. The overlap in participation between Phases 2 and 3 of the research design is indicated in Table 6.1, with a subset of Phase 2 householders choosing to continue their involvement in the Phase 3 workshops. I hosted the first half-day workshop at my home with five participants and the facilitator; the second took place soon after in central Hobart with eight participants. The final workshop took place in November, when the facilitator became available once more. This workshop was hosted by a participant at her home in Launceston, the second largest city in Tasmania.

Participants generated a rich array of symbolic imagery, maps, lists, diagrams and sketches, a selection of which are featured throughout the chapter. In Table 6.1, the Phase 2 settings are named by density type and the order in which I visited that type. These density categories were derived from those commonly used in housing policy and urban studies (for example, Randolph, 2006; Steele, 2012). The first suburban setting is therefore named 'Suburban 1', the second 'Suburban 2', and so on.

<b>Phase 2 household settings (in order of visits)</b>	<b>Phase 3 Workshop 1 (n = 5)</b>	<b>Phase 3 Workshop 2 (n = 8)</b>	<b>Phase 3 Workshop 3 (n = 6)</b>
Rural 1			
Suburban 1			
Suburban 2			○
Medium-density 1		○	
Cooking school + residence			
Suburban 3	○		
High-density 1			
Medium-density 2		○	
Suburban 4	○		
Rural 2			
Rural 3			
Suburban 5		○	

Table 6.1: Household setting types in order of visits, with the circles indicating the Phase 2 participants who also took part in a Phase 3 workshop

It is noteworthy that the majority of participants in the study were women. In nine of the 12 household settings, women were the primary instigators of food growing and the development of productive spaces. In all households occupied by a couple however, some form of shared responsibility for food producing, provisioning and cooking was expressed, as were descriptions of how the roles were variously negotiated between partners. This connects with the increasingly nuanced picture of food work and cooking that Angela Meah (2013) and Michael Pollan (2013) suggest in their recent writing, while acknowledging that domestic food work has persisted largely as a female role. All of the workshop participants were female, most of whom can be described as socially engaged and active users of social media. In terms of social representation, I acknowledge a wider spectrum of home-based food growers in Tasmania

including those who grow using conventional methods, without a 'sustainable' or ecological engagement.

The 12 household settings are profiled in Section 6.2 with the food producing practices of each identified and discussed in relation to the spatial-material home environment and interactions with broader sustainable living approaches. This focus for analysis is further backgrounded by the rich context established by the social-ecological analysis of the previous chapter. My discussion below incorporates and extends the preliminary analysis summary prepared for, and shared with participants in August 2013 (refer to Appendix B).

## 6.2 Phase 2 multi-household ethnography analysis

The households are clustered by density type rather than the chronology of my visits, beginning with rural, and scaling down through suburban and medium-density to high-density. The rationale for this sequence is the greater diversity of production methods, food types, and energy, water and nutrient cycling systems supported by the rural settings, which establishes a comparative basis for subsequent discussion of the other settings and scales.

### The rural settings

The four rural settings located in northern and southern Tasmania are profiled in this section, followed by the suburban, and medium-density and high-density, in two further sections.

#### Rural 1

Rural 1 is a smallholding in northern Tasmania owned by a family with three young children and is also the site of the family's business, a plant and tree nursery. The crucial water supply is contingent upon tanks and a dam, making water management a major priority for the farm, along with land remediation. Small numbers of cattle and sheep are raised for meat, some of which is sold, and chickens provide sufficient eggs for the family, with the latter consuming nearly all kitchen scraps. Cow manure provides essential nutrients for the vegetable garden that is based on organic methods, with rotation beds and a

permanent bed for edible perennial plants. While the vegetable garden is proximal to the house, access to the kitchen from the garden is via the living room.

The householder reported a severe lack of storage for bulk food purchases and especially when the slaughter of a single cow generates around 300kg of meat to be frozen. While having made some forays into preserving and cheese making, the householder spoke of the need for mentoring and also a desire to re-purpose the laundry as a scullery dedicated to food processing. While the house has been designed without internal load-bearing walls to allow for future adaptations, at present its spatial layout resembles a typical two-level suburban house without any concessions to the significant food producing practices in which the family is engaged and committed to on sustainability grounds.

## Rural 2

Rural 2 comprises a small market garden and home set within a larger property in southern Tasmania. Again water supply is provided by tank and dam storage with an irrigation system installed to the orchard and raised garden beds that are laid out within fenced enclosures to exclude possums and rabbits. A range of structures, including a polytunnel and support frames has been purpose-built to enable year-round production of a large range of crops, a proportion of which supplies the local community-supported agriculture (CSA) program. Non-certified organic methods are employed but without livestock other than one horse on the property, manure mixes and other nutrient inputs are trailered in to complement the composted garden waste.

The owners, a couple, generate little kitchen-based compost relative to the scale of the garden, despite deriving most of their fresh food there. The participant is also skilled in preserving and routinely cooks food to be consumed at a later date. She recently had an under-stair larder built adjacent to the kitchen for this purpose in which bottled and frozen foods are stored, along with the requisite bottling and dehydrating equipment as illustrated in Figure 6.1. The kitchen has been designed dually as a highly presentable social space and for intensive cooking with easy access to bulk foods made visible via shallow pantry shelving along the rear wall.



Figure 6.1: Purpose-built larder



Figure 6.2: Entry porch with table for raising seedlings

As the garden is located some distance from the house to ensure its wind protection, there is little direct house-garden interaction but a sunny entry porch doubles as a valuable work space for germinating seeds and tending seedlings prior to planting out (Figure 6.2). While there is a large shed sited beside the garden, the householder expressed the need for a work space with a sink located there for pre-processing produce on its path to the house and kitchen or for delivery to the local CSA.

### Rural 3

Rural 3 is another smallholding and family home located in northern Tasmania, with a large organic-permaculture hybrid garden and orchard to support the self-sufficiency goal of the parents. Livestock plays a central role in this system design with cows, chickens and guinea fowl providing meat, and goats and cows kept for milking. Growing forage for the animals is integral to the nutrient cycle as the garden is dependent upon animal manure and semi-composted animal bedding. The garden has been sited according to topography rather than proximity to the house, below the level of the dam that is the only source of irrigation (Figure 6.3). A hay barn is planned to better manage forage and

composting, and also to incorporate a root cellar for storing vegetables, and ideally a windbreak structure for early morning milking.



Figure 6.3: Permaculture garden sited for optimal irrigation

Cooking from scratch is a very common activity in the household with the participant also running an artisan baking business in addition to her full-time job, demanding lidded storage bins for 25kg bags of flour under the cantilevered kitchen bench. In addition to preserving fruit and vegetables, bread baking, cheese making, dispatching fowl and freezing butchered meat are all routine household practices. Consequently, the couple articulated the need for a ‘wet’ outdoor kitchen for processing and preserving, with ample layover space and storage for the preserving equipment and cheese press. Preserving enough produce for the winter relies upon swapping surplus with neighbours, and its storage will demand a dedicated larder in future renovations.

### Cooking school and residence

The final setting in this cluster is a ‘paddock-to-plate’ cooking school and family residence located in southern Tasmania for which the owners, a couple with two young children, drew considerable inspiration from the River Cottage concept (Section 5.3). The century-old house and outbuildings have been adapted along with the development of an intensive smallholding with pigs, goats, chickens, guinea fowl, beehives and productive lands and polytunnels to ensure year-round produce favouring heirloom varieties. Water is pumped from the nearby river to tanks followed by laborious hand watering in dry weather. ‘Closed loop’ nutrient and energy systems are also the goal of these owners but

supplementation inputs are needed to achieve the volume of produce required for the cooking school such as the tomato preserving course shown in Figure 6.4.



Figure 6.4: Tomato tasting at 'paddock to plate' cooking school



Figure 6.5: Temporary equipment set up for the tomato harvest course

This setting celebrates and updates its pre-industrial food axis with spaces appropriated according to specific food preserving requirements. Hams are cured in an alcove under the cool southern side of the house. A dry store is steps away from the back porch, while a smokehouse has been erected some distance across the yard. The commercial standard and size of the kitchen allows butchering and processing to take place despite the absence of a wet or dirty transition space outside, but the associated equipment and bulk supplies jostle for accommodation in the kitchen in which eight people work during courses. The yard also allows for temporary infrastructure during specific periods such as the passing, sealing and sterilising equipment essential for the tomato harvest and seen in Figure 6.5.



## The suburban settings

In this section, the five suburban settings located in Launceston and the Hobart region are profiled.

### Suburban 1

Suburban 1 is a modest 1960s house and yard located in a suburb of Launceston, Tasmania. Owned by a couple aiming to be as self-sufficient as possible, all potential growing space has been appropriated and planted according to the affordances of different areas. The wind-protected front garden has been planted as a fruit forest, the sunny driveway verge is planted with tomatoes and squashes (Figure 6.6), and opposite it the brick veneer house provides a heat sink for sweet peppers and chillies. The rear yard is divided into a small lawn for the two family dogs and loosely rotated mixed beds, with chickens allowed into the beds to clean up between crops. Garden fences and shed walls are also used for trellised and vine fruits. All the essential infrastructure housing the chickens, separating dogs from chickens, and chickens from garden beds has been devised and made with salvaged, re-purposed materials by the participant's partner.



Figure 6.6: North-facing garden beside driveway planted for maximum yield

The participant expressed satisfaction with the original house plan that allows easy access from the roomy kitchen to garden, highlighting the usefulness of a large sturdy dining table beside the kitchen that is used for projects such as drying produce, making soaps and salves, as well as the jointing of sheep



carcasses prior to freezing. With adult children having left home, a spare bedroom on the cooler side of the house now serves as a larder with reinforced wardrobe shelves storing preserved and dried fruit and vegetables to last the winter and spring along with preserving equipment, featured in Figure 6.7. The couple documents the target yields they need each season to achieve their ideal volume of preserved produce. Their willingness to accommodate major food-producing projects in their living space was conveyed as part of a broader commitment to the way of life they are actively pursuing.



Figure 6.7: Larder in a cool guest bedroom adapted from a wardrobe

## Suburban 2

Suburban 2 comprises a recently constructed studio house of around 40 square metres tucked into an urban infill site in Launceston. With only driveway frontage to the street, the site is surrounded by established homes, trees and shrubs that all determine sun access to the site. The garden has emerged from extensive trialling of different crops and fruit trees in different locations, such that beds and compost heaps are dynamic and re-sited from season to season. Central to the sole owner's preference for summer gardening and seasonal eating over preserving and freezing is a large, elevated north-facing deck serving as a social space and highly productive container garden as shown in Figure 6.8. Rainwater tanks are located under the house to complement the town water supply; however, the water is not potable due to air pollution sediments.



Figure 6.8: Productive container garden on deck outside kitchen



Figure 6.9: Ripening produce on the dining table during harvest season

The deck also provides entry into a compact combined kitchen, dining and living space used for both socialising and intensive cooking despite its small overall dimensions. A long sunny windowsill overlooking the deck provides a site for seed germination, fruit ripening and frost protection for spring seedlings, while harvested produce rests on the generous dining table until needed (Figure 6.9). In common with the previous setting, the participant's willingness to appropriate her living space for a range of temporary food-related purposes is key to her satisfaction with her home. The need for storage of garden equipment and

space for the processing tasks of growing food is currently unmet, providing the focus for this participant in her Workshop 3 responses.

### Suburban 3

Suburban 3 is a recently built project home located in a subdivision on the outskirts of Hobart, Tasmania. Purchased to meet the needs of the sole owner and her disability, the level garden was re-purposed to combine native planting for low maintenance with raised bed and container vegetable and fruit growing suited to eventual wheelchair access. The participant grows a large range of seasonal produce that she enjoys eating and preserving, as a supplement to local, store-bought food. Staged composting is a priority with two bays for garden waste and two worm farms for kitchen waste in operation. As she is unable to work any longer, cooking and art practice are central to this participant's daily life, with family support and limited fortnightly garden assistance making her current living arrangements possible.



Figure 6.10: Ripening produce on sunny windowsill with stainless steel lining

The north-facing garden and large U-shaped kitchen are connected via sliding doors and a pergola supporting grape vines, under which herbs and garlic are grown in pots. The kitchen's wide stainless steel sheeted windowsill plays a vital role in seed germination and storing ripening produce (Figure 6.10). Under-utilised corner cupboards provide darkened storage for the potato harvest and

jars of preserves, but the ample cupboards do not make provision for sorting waste.



Figure 6.11: Garden equipment and inputs requiring storage

Storage for garden equipment and inputs is similarly not catered for at present due to minimal garage dimensions, with the participant acknowledging this will become increasingly difficult for her to access (Figure 6.11). While the house and garden meet the majority of her needs, the lack of community in the subdivision was lamented by the participant who had attempted, and failed to make to date, social connections and locate other food gardeners.

## Suburban 4

Suburban 4 comprises a 1970s house and garden on the southern outskirts of Hobart recently purchased by a couple downsizing from a rural smallholding. It also involves adapting to the demands of the disability of the participant's husband. A remnant garden with fruit trees has been extended to maximise food production, in addition to extensive new planting for biodiversity. The participant is experimenting actively with microclimates, vertical trellised planting and warmer climate varieties in an attempt to extend their food supply throughout the year. In addition to producing her own herbal cleaning products, the participant sources surplus produce from others to preserve and store, and is motivated to prepare the best quality food possible in response to her husband's auto-immune disease.





Figure 6.12: Laundry inside rear door adapted for washing vegetables en route to kitchen

Initial renovations were centred on installing solar power and hot water, and reconfiguring the kitchen and laundry. These spaces are linked to the garden via a rear, covered deck with potted herbs and salad, leading down to graded access pathways between raised, accessible beds. The laundry immediately inside the backdoor now serves dually for processing produce prior to cooking and storing (Figure 6.12). A mobile central island bench is particularly valued for its flexibility and for lending extra layover space during preserving and other kitchen projects. As far as possible the couple has sourced recycled and salvaged materials for all the house and garden improvements, utilising second hand trading websites and community networks.

## Suburban 5

Suburban 5 is a renovated older weatherboard house located in an inner Hobart suburb, with a yard that once featured roses, lawns and ornamental borders but is now transformed by the two householders. The yard balances drought-resistant native planting for wildlife and biodiversity with intensive year-round food production. Chickens provide eggs and manure with two of the five compost bins located within the chicken enclosure. As with Suburban 1, the chickens provide clean-up services between crops and are managed via temporary netting. The productive areas combine raised and in-ground beds

and containers, with existing easy-access terraces now planted with berries, herbs and salad as shown in Figure 6.13.



Figure 6.13: Hard landscaping adapted to maximise productive areas



Figure 6.14: Purpose-built larder replacing previous entry to the house on southern side

In addition to being self-sufficient in garlic, bottled tomatoes, herbs and herbal teas, the couple grows for dietary preferences including raw foods and a passion for Thai cuisine. They also preserve and bottle fruit and freeze berries each season. The kitchen is organised specifically for shared cooking, along with differentiated waste sorting for the chickens, worm farm and general compost. Given a distaste for frequent food shopping, the couple has adapted the original entrance on the south-eastern side of the house into an insulated larder now accessed internally from the hallway (Figure 6.14), relegating the entrance to the side of the house. In addition to seed-saving, seasonal crop plans, varieties and yields are all documented in an ongoing attempt to optimise the productive system.

## The medium-density and high-density settings

The two medium-density settings and one high-density setting, all located in inner urban suburbs of Hobart, are profiled in this section:

### Medium-density 1

Medium-density 1 is a two level townhouse with courtyard garden rented by a couple with adult children who come and go as houseguests. The townhouse is one of several on a 1990s redevelopment site in an inner suburb of Hobart. For reasons of thrift and a desire to produce as much of their own food as possible, all outdoor space with sufficient sun access is under production, including appropriated common ornamental garden beds for squash and potatoes (Figure 6.15). Produce is shared with neighbours, many of whom are also renters, in the hope they will accept this use of common space. The courtyard garden relies most upon containers for leafy vegetables, herbs and citrus, with fences used for vertical crops such as peas, beans and tomatoes. There is insufficient space for three staged composting bins considered ideal by the participant, and vermin-proofing the single bin has become a necessity.



Figure 6.15: Common garden beds interplanted with squash



Figure 6.16: Improved pantry in garage with bins for bulk purchases

Along with their own produce the couple preserves fruit and tomatoes when in season and plentiful by bottling and dehydrating, and freezing vegetables, sauces and pesto. The separate laundry room behind the open plan kitchen allows for a sizable fridge-freezer and high shelves for storing preserving



equipment. The garage with internal access now serves as a home office but also includes an open-shelved pantry with large bins for bulk purchases of staples such as rice and pasta and supermarket specials, as shown in Figure 6.16. Upstairs in the guest bedroom, the townhouse's only sunny windowsill is used for germinating seeds prior to planting out, as the courtyard is deprived of winter sun. Arising from the couple's improvisations and commitment to their food practices, the townhouse exhibits a dispersed food axis more akin to pre-industrial housing. This demonstrates the potential for purpose-designed settings to be significantly improved.

## Medium-density 2

Medium-density 2 consists of a semi-detached Georgian terrace in Hobart's inner west rented by a young couple expecting their first child. Having grown up in food gardening families, the couple made best use of the small, graded backyard's mature fruit trees and existing terraced beds by planting leafy vegetables, garlic, beans, tomatoes, rhubarb, tomatoes and herbs, with their landlord's support. They regretted not being able to make use of a west-facing masonry wall as a heat sink for fruiting vines (Figure 6.17), given their intention to relocate. The participant described their approach as a low maintenance 'food forest' with mixed beds that allow them to eat whatever is in season, without any current desire to preserve food other than garlic and dried beans.



Figure 6.17: Food forest garden behind rented terrace house



The couple were participating in a composting trial run by Hobart City Council in which households weighed and documented their kitchen waste weekly. The participant noted that the volume they produced was too little for the garden's needs. Access from the garden to the kitchen is via a short hallway, with a table by the rear door used for potted herbs and cleaning vegetables on their way indoors.



Figure 6.18: Improvised open pantry with stairway used for hanging the garlic crop

The rudimentary kitchen severely lacks bench space and storage, such that the couple had improvised an open pantry under the stairway, using the balustrade for hanging garlic, as featured in Figure 6.18. Committed to living resourcefully, the couple take turns to cook simply from scratch and invite friends with similar interests and values for meals. Unsurprisingly, the participant foresaw the need to pre-prepare and freeze food upon the arrival of her baby, so the couple was actively seeking a more practical rental property without steep stairs and with better kitchen facilities.

## High-density 1

The High-density 1 setting is a 1930s apartment located above a busy shopping street in central Hobart with only a tiny rear balcony and stairway offering potential growing space. The owners, a young couple, grow a mixture of ornamental and edible potted plants, with the latter only possible in the summer when there is sufficient sun access. Tomatoes, chillies, citrus and herbs are grown for frequent home-based cooking and socialising. The couple source the majority of their produce from the nearby organic growers' market and rarely visit a supermarket, even brewing beer at home. They regret that composting is not viable in the limited outdoor space, also because of the proportions of carbon- and nitrogen-based materials needed for it to function. Garden inputs are carried up to the balcony and stored under a sitting platform (Figure 6.19).



Figure 6.19: Storage for garden inputs located under a platform built from railway sleepers



Figure 6.20: The laundry line sculpture made from salvaged industrial materials

The kitchen is located deep within the floor plan and has been renovated to open it up to the living area which has a long sunny windowsill suited to germinating seeds and housing some plants during winter. With a goal of making the balcony as usable as possible, the participant's partner devised the sitting platform using railway sleepers, and built the sink bench and laundry line sculpture, using salvaged industrial materials wherever possible (Figure 6.20). The updated kitchen is similarly a combination of original, now retro joinery, and re-purposed materials with only appliances purchased new for 'serious cooking', as termed by the participant.

## 6.3 Phase 2 summary

Across the 12 settings, growing food emerged as a theme connected with living more sustainably or with a lower ecological footprint, as variously expressed by participants. The majority of householders had adopted complementary strategies, increasing energy efficiency via installing insulation and solar power systems, for example, along with conserving water, minimising waste, and recycling and re-using existing resources. Growing and producing food are practices in which values and concerns about food, the environment and in some cases, consumption, are being enacted, albeit with different emphases as I expand below. Many participants expressed that they grow food for reasons of health, well-being and fulfilment. The motivations for producing food at home vary; the goal of some is to supplement other food sources – often local, seasonal and organic – while others are seeking to be as self-sufficient as possible. Self-sufficiency is also pursued for different reasons; ecological and resilience motivations were expressed, while for others thrift and necessity were identified as priorities.

### Growing and producing methods relative to scale and tenure

While participants are committed to growing with organic methods as far as possible, two distinct approaches are evident, linked to scale, garden area and whether animals play a role as they do in a subset of rural and suburban settings. The approach involving animals relies upon manure and the ‘services’ provided by moving around chickens and pigs. This enables householders to achieve tighter, if not fully closed loop systems in their gardens, akin to the principles of permaculture set out by Mollison and Holmgren (1978) and Mollison (1990). Common to nearly all settings however, is an inability to generate sufficient compost on site to maintain soil fertility. The other approach common to suburban and higher density gardens relies upon a range of external garden inputs, such as bagged potting mix, pelletised manures, trace elements and seaweed concentrate, mirroring in some respects the convenience of processed food ingredients. The broader uptake of home and community growing is pushing demand for these essential inputs however, which will have flow on ecological impacts as with the examples of phosphate mining and depletion of peat bogs.

The household profiles revealed that most of the settings were owned with the exception of the two rented medium-density examples. It is evident, even in these cases, renting does not preclude growing food, but it does place greater constraints on methods, nutrient cycling, crop types and the ability to make adaptations for improved sun access and food storage. Longer-term investments in soil improvement and food plants that are slow to establish are incompatible with potential rental transiency. I acknowledge the setting, High-density 1, does not typify the large-scale, multi-dwelling housing types commonly occupied by renters in more populous cities. In such settings there may exist many constraints to food production such as body corporate regulations, an absence of balcony drainage, balcony weight load limits and poor air quality as Indira Naidoo raises in *The Edible Balcony* (2011). Arising from his advocacy work with community groups, Michael Mobbs (2012) concedes that for many renters in such settings, community gardens and farmers' markets are more realistic options. Higher density housing and rental tenure do clearly compromise the ability for food production in comparison with the highly productive, owner-occupied suburban settings I visited. The workshop discussion in Sections 6.4 and 6.5 expands upon the issue of tenure and its implications.

### Food to the kitchen: Harvesting and provisioning

It is clear that planning for the journey of food from garden to kitchen was not on the agenda if gardens were originally conceived of as lawns, ornamental planting, entertaining areas, and play spaces. In several settings, the kitchen, laundry and storage zones had been adapted to redress this misalignment and support more directly food producing. The kitchen attributes most valued are generous and continuous bench space for processing, a sunny windowsill for germinating seeds and ripening, and plenty of storage cupboards to house the equipment of home-produced food. At harvest time, ripening and preserving space is at a premium, with the need to borrow surfaces and furniture normally used for other purposes. Existing kitchens, as observed, are poorly equipped for a systems approach to sorting and storing organic waste for cycling back to the garden. Typically absent is the easy-to-use, internal 'waste management centre' Olkowski *et al.* (2008) promote to encourage all members of the household to sort and recycle waste either for the garden or for municipal

recycling. The IKEA example I presented as an ecological agent in Section 5.4 would qualify as this type of facility.

Further distinctions arose between the practices of those who garden only in the summer, those growing for either seasonal or year-round supplementation, and those aiming to be as self-sufficient as possible. Generally speaking, the latter two goals accord with more intensive demands on food spaces and a more dispersed food axis, especially where butchery and activities such as cheese-making and brewing are carried out. These activities also demand more specialised food preparation equipment such as that set up temporarily for the cooking school's large-scale tomato harvest (Figure 6.5).

### Preserving and storing

As noted, eating seasonally is a primary objective for some householders, so that preserving food for later use is not a priority. Most engage in some form of preserving however, with many combining their own produce with other sources of bulk, ripe and affordable produce at harvest time. Bottling, dehydrating, freezing and dry storing (for example, potatoes, onions and garlic) are common methods, with an awareness that a mix of methods is prudent should a major blackout ruin freezer stocks. There was awareness too that freezing is a more energy-intensive preserving method, reliant upon electricity throughout the year. Typically, the seasonal availability or gluts of particular crops drives what ends up preserved in any given year, and by what methods.

For those householders also committed to buying bulk wholefoods such as flour, grains and pulses, the demands on pantry storage are quite different to joinery built for standard politely packaged foods. Bulk foods require large, easy-access, vermin-proof bins or bags, robust shelving or under-bench space, and a 'stock control' method for storing top-ups until the current batch in a bin or bag is fully used. Purpose-built and improvised larders featured in several settings, making good use of sunless, colder spaces. Larders often combined the considerable amount of equipment required for preserving such as one or more Fowlers urns, jars and lids of different sizes, and perhaps a dehydrator, along with the filled jars.

## Householder-initiated adaptations

In several cases, the home and garden had been adapted for home-based food production. Others were in ongoing states of transformation sometimes according to some form of 'master plan', with determined re-purposing of second hand materials. Notable in recent adaptations was the need for some form of transition kitchen for cleaning produce and other household projects with sinks or tubs and benches being installed near to the kitchen entrance or close to garden beds. In order to make gardens productive, considerable infrastructure is required such as raised beds, frames, trellises, stakes, containers, enclosures and animal shelters. While all these are commercially produced and widely available commodities, there was almost unanimous aversion to purchasing such items off the shelf. Thrift and resourcefulness abounded and there was palpable pride and meaning associated with the re-use solutions devised by householders, often with stories attached to particular recycled or gifted objects. These particularly illuminating themes and practices are further developed through two focused discussions in Chapter 7.

## 6.4 Phase 3 design workshops analysis


The three half-day design workshops were structured according to the outline below, with some variation arising from the facilitator and my responses to group dynamics and interests expressed within the workshops. The time for reflection afforded by the later staging of the final workshop also shaped how the workshop activities unfolded.

- Activity 1: Meanings of ‘sustainable food’ conveyed by participants’ explanation of a single symbolic image or artefact;
- Activity 2: Dilemmas experienced in food producing and sourcing, represented via lists, maps and diagrams; and
- Activity 3: Design speculations for optimising ecological food production at home, expressed via drawings, diagrams and lists.

Participants’ responses to each of these activities are summarised and discussed, along with selected examples of their ideation work. To maintain brevity in all tabled summaries, I have aggregated duplicate or like responses but sought to maintain the diversity of issues and ideas.

### Activity 1: Meanings of ‘sustainable food’

The first activity served as an icebreaker with participants introducing themselves along with their symbolic image, which was either in print or electronic form. These introductions extended to identifying the broader sustainable practices of participants in the first workshop, reflected in Table 6.2, but in the interests of timekeeping this discussion was omitted from Workshops 2 and 3 as we found that these practices were discussed in the two activities that followed.

Workshop	Participants' meanings of 'sustainable food'
Workshop 1	<ul style="list-style-type: none"> <li>- The connections and process of growing, harvesting, preserving and eating food.</li> <li>- Living lightly on the earth, from childhood what you didn't grow or raise, you didn't eat.</li> <li>- Growing and preserving as much as possible at home, but is it actually more about self-sufficiency?</li> <li>- Supplementing food from elsewhere as much as possible, and preserving allows gift-giving and bartering. The garden is emotionally sustaining (see Figure 6.21).</li> </ul> <div>  <p>The collage consists of four square photographs arranged in a 2x2 grid. The top-left photo shows several ripe red tomatoes on a patterned surface. The top-right photo shows a bunch of green grapes in a metal colander. The bottom-left photo shows several purple onions with their roots. The bottom-right photo shows several yellow potatoes in a metal colander. Below the photos, there is a small handwritten note that reads 'SUSTAINABLE → SUFFICIENT'.</p> </div> <p>Figure 6.21: Collage of home-grown produce, symbolising supplementing other food sources as much as possible</p> <p><b>Broader sustainable practices</b></p> <ul style="list-style-type: none"> <li>- Recycling as much as possible, including organic waste back to the soil.</li> <li>- Buying second hand goods and retrofitting the home, upcycling if possible.</li> <li>- Installing solar, insulation, double-glazing and conserving water.</li> <li>- Sharing food, tools and knowledge with others.</li> <li>- Buying local to limit demand for transportation and to curb own travel.</li> </ul>



Workshop	Participants' meanings of 'sustainable food'
Workshop 2	<ul style="list-style-type: none"> <li>- Sustainable food is part of a system connecting the home garden and consumer with particular community, agricultural and political institutions.</li> <li>- It is a cycle integrating health, wholeness and longevity for people and the environment (see Figure 6.22).</li> </ul> <div> </div> <p>Figure 6.22: Apple image symbolising sustainable food as cyclical and holistic</p> <ul style="list-style-type: none"> <li>- Captured by a victory gardens poster from the Second World War: 'You can use the land you have to grow the foods you need'.</li> <li>- Own produce, fresh and preserved, knowing exactly where it comes from.</li> <li>- Tasmanian Food Forest flyer: 'Building stronger communities through growing, collecting and sharing fruit and veggies'.</li> </ul>

Workshop	Participants' meanings of 'sustainable food'
Workshop 3	<ul style="list-style-type: none"> <li>- Grandson eating an heirloom apple; smallholders will maintain the heritage of plant varieties as a kind of ark, in the face of Monsanto.</li> <li>- "I am using myself as an example. I grow my own food, bake bread, keep chickens and manage type 2 diabetes solely through diet."</li> <li>- Living in an energy efficient house and being able to cycle to an urban farm and share produce.</li> <li>- The presence of a native frog indicates the health of the garden as an ecosystem. It is not just about growing lettuce in pots.</li> <li>- Water symbolises food. Without water, there can be no food.</li> <li>- The houses of an Italian coastal village show the modifications over time such as those for food production. Function is privileged and villagers appear to live within their means, improvising ways of provisioning food and accessing resources.</li> </ul>

Table 6.2: Participants' meanings of 'sustainable food' by workshop, expressed in tandem with an image or artefact

A significant contrast between individual participants across all three workshops was in understanding sustainable food as the pursuit of self-sufficiency, or as supplementation within a wider sustainable food network. The ensuing discussion raised important distinctions in participants' understandings of 'sustainable' more broadly, with some emphasising collective strategies, and others their individual responsibility. Contrasting emphases and priorities also emerged in each workshop. The first workshop responses were centred predominantly on participants' own food-producing practices, values and ways of living. Participants' responses in the second workshop were notably more focused at the community scale and on the interplay of social and political issues pertaining to food, while the third workshop responses combined these scales and concerns. This is likely due to the fact that the second workshop was attended by several highly engaged food and health advocates including a general practitioner, a dietitian, the president of a city farming association, an ecologist and aid worker, and a school garden convenor. The connections participants articulated between home and community scales were immensely valuable and are elucidated in my later discussion of Activity 3, the speculative design activity.

## Activity 2: Dilemmas experienced in food producing and sourcing

The second activity sought to identify dilemmas associated with producing and sourcing food, and while the facilitator and I encouraged a spatial focus on the home, we did not wish to limit other interpretations given our view that spatial understandings are socially and culturally embedded. Participants' responses for the first and second workshops are set out according to environmental, spatial, and personal groupings, followed by two example representations. Prior to the final workshop, the facilitator and I agreed that more focused spatial data were required and re-worked this activity, inviting participants to consider both what was working well spatially and functionally in their current home setting, in contrast with what was working less well or not at all, relative to their food producing practices. This variation is reflected in the responses in Tables 6.3 and 6.4.

Environmental dilemmas	Spatial dilemmas	Personal and social dilemmas
<b>Workshop 1</b>		
<ul style="list-style-type: none"> <li>- Necessity to buy goods with excessive packaging</li> <li>- Limited availability of fresh food from Tasmania in winter/spring</li> <li>- Reliance upon foods from mainland (grains, legumes) and overseas (tea, coffee, spices)</li> <li>- Need to protect crops from birds and vermin</li> </ul>	<ul style="list-style-type: none"> <li>- Size of suburban plot and sun access limits yield and crop varieties</li> </ul>	<ul style="list-style-type: none"> <li>- Guilt experienced from still using supermarkets</li> <li>- Desire to keep travelling and moving on works against planting an orchard</li> <li>- Lack of growing knowledge and skills, learning by trial and error</li> </ul>
<b>Workshop 2</b>		
<ul style="list-style-type: none"> <li>- Australian produce versus overseas organic (see Figure 6.23)</li> <li>- Balancing summer and</li> </ul>	<ul style="list-style-type: none"> <li>- Crop rotation when previous season's crops are still in the ground and seedlings are ready to</li> </ul>	<ul style="list-style-type: none"> <li>- Limits to bulk, in-season produce that can be carried from market via bicycle</li> </ul>

<b>Environmental dilemmas</b>	<b>Spatial dilemmas</b>	<b>Personal and social dilemmas</b>
winter yields – from excess to zilch - Dependence upon external inputs (fertiliser, building materials) - Risks of foraging on public land such as lead and other heavy metals in soil - Neighbours' woodpile rats destroying crops	plant - Sun shading from neighbours' trees and invasive plants - Small, sunless windows prevent growing seedlings indoors (see Figure 6.24) - Lack of storage for garden tools and compost bins - Lack of fencing to allow toddler to be in garden, and to keep rabbits out - Direct access to house from clay soil garden is a disincentive to garden	- Renting prevents long-term planning and investment in plants and soil quality - Social disadvantage and malnutrition from poor diets (food deserts) - Long-term responsibility for community gardens and programs - Under-valuing of the skills of unemployed farmhands, orchardists and pruners - Skill shortage and decline of manual making skills (growing, cooking, carpentry, sewing, mending)

Table 6.3: Dilemmas identified by participants in producing and sourcing food, by environmental, spatial or personal and social grouping

The manner in which the spatial becomes entwined with environmental and personal dilemmas was expressed by a participant who was unable to grow the quantity of tomatoes she needed to preserve for the winter and spring, despite sufficient garden space. Her complex decision path for sourcing preserved tomatoes features in Figure 6.23, with options evaluated according to food miles, whether Australian or organic in origin, the reusability of packaging, and the relative merits of travel modes for sourcing. Even if able to source bulk, local tomatoes by resorting to car use, carrying out hot water sterilising in her kitchen with a toddler present remained a challenge in her view.

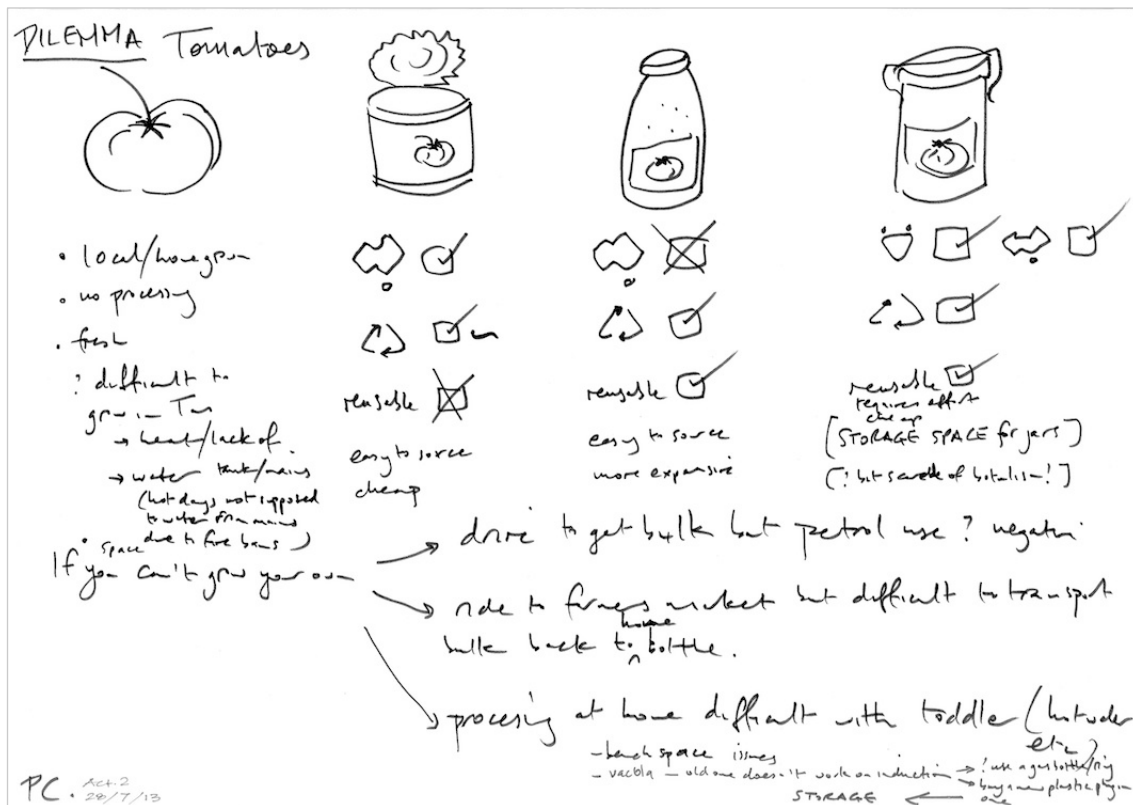


Figure 6.23: The tomato-sourcing dilemma as evaluated by one workshop participant

Drawing together the multiple constraints of her rental townhouse setting in Figure 6.24, another participant captures the impact of the built form with its poor orientation, small windows, hard landscaping and lack of indoor and outdoor storage, while highlighting the dynamic impacts of neighbouring trees blocking sun access over a number of years and the incursion of neighbouring plants' roots into vegetable beds. In both these cases, the temporal aspects of food producing come to the fore, whether related to stage of family life, or to changes wrought by proximal vegetation over time.

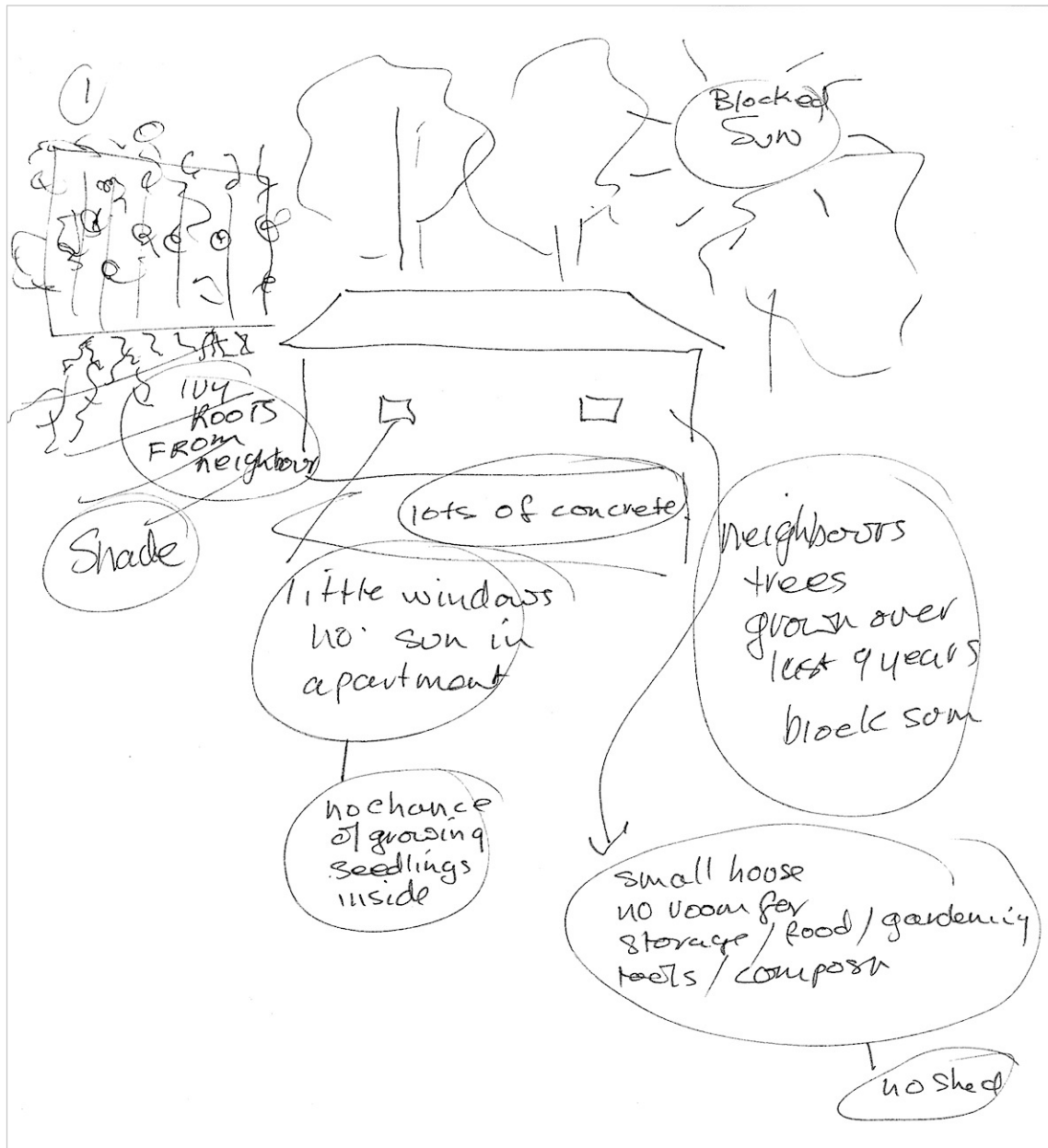


Figure 6.24: A visual summary of the spatial dilemmas posed by the townhouse occupied by a long-term renter

In Workshop 3, participants undertook spatial and functional evaluations, identifying features currently working well in their home environment, in addition to those working less well, or not at all. The collated responses follow in Table 6.4:

Working well in current home environment	Working less well, or not at all
<ul style="list-style-type: none"> <li>- Courtyard garden with proximity to kitchen</li> <li>- Sunny area with herbs, salad and tomatoes near to kitchen door</li> <li>- Sharing with neighbours (food, social events, travel and kitchen scraps for eggs)</li> <li>- Access to community garden and market to buy bulk produce and have ‘cook ups’ with friends</li> <li>- Easy access to yard from street for large straw bales and mulch</li> <li>- Large, elevated, sunny deck with direct access to kitchen and movable furniture and pots</li> <li>- Visual connection from house to garden, or on path to washing line to observe crop progress and plant needs</li> <li>- Garden spaces separate so can be ‘visited’ for variety and pleasure</li> <li>- House ‘not precious’ and able to be transformed for food projects</li> <li>- Outdoor BBQ area that can also be used for cleaning, chopping and drying</li> <li>- Workbench with sink and chopping board located in garden</li> <li>- Recycling of household grey water to garden and to ponds for wildlife</li> <li>- Indoor storage for preserves on shallow shelves for visibility and stock control</li> <li>- Reasonably-sized freezer, ideally upright to eliminate bending with transparent drawers for making contents visible</li> </ul>	<ul style="list-style-type: none"> <li>- Constraints of existing housing infrastructure (steep streets and yards, hard landscaped beds, gardens separated from kitchens and utility rooms separated from kitchens)</li> <li>- Wasted house space when most activities are centred on garden and kitchen</li> <li>- Verandah under-utilised for food production</li> <li>- Lack of storage for garden equipment and essential inputs</li> <li>- Water wastage and disincentives for installing rainwater tanks (Council regulations and cost)</li> <li>- Poorly located, or absence of external water taps</li> <li>- Absence of facilities for cleaning vegetables and potting</li> <li>- Kitchen joinery demands bending with low, deep cupboards unsuited to larger equipment and storing preserved foods</li> </ul>

Table 6.4: Workshop 3 participants’ spatial and functional evaluations of their current home environment

In evaluating her small detached home, one Workshop 3 participant colour-coded positive aspects in green and negative aspects in red, overlaying her practices onto the plan view in Figure 6.25. Valued, for example, is the ease of sharing produce and seeds with her like-minded neighbour, and the neighbouring chickens' ability to access her yard via a hatch in the common fence. Access from the garden to the kitchen via the living room is regarded as problematic and compounded by the lack of a convenient tap for washing hands and vegetables. These shortcomings are the target of this participant's design response in the outcomes of Activity 3, presented among a range of speculations in the following section.

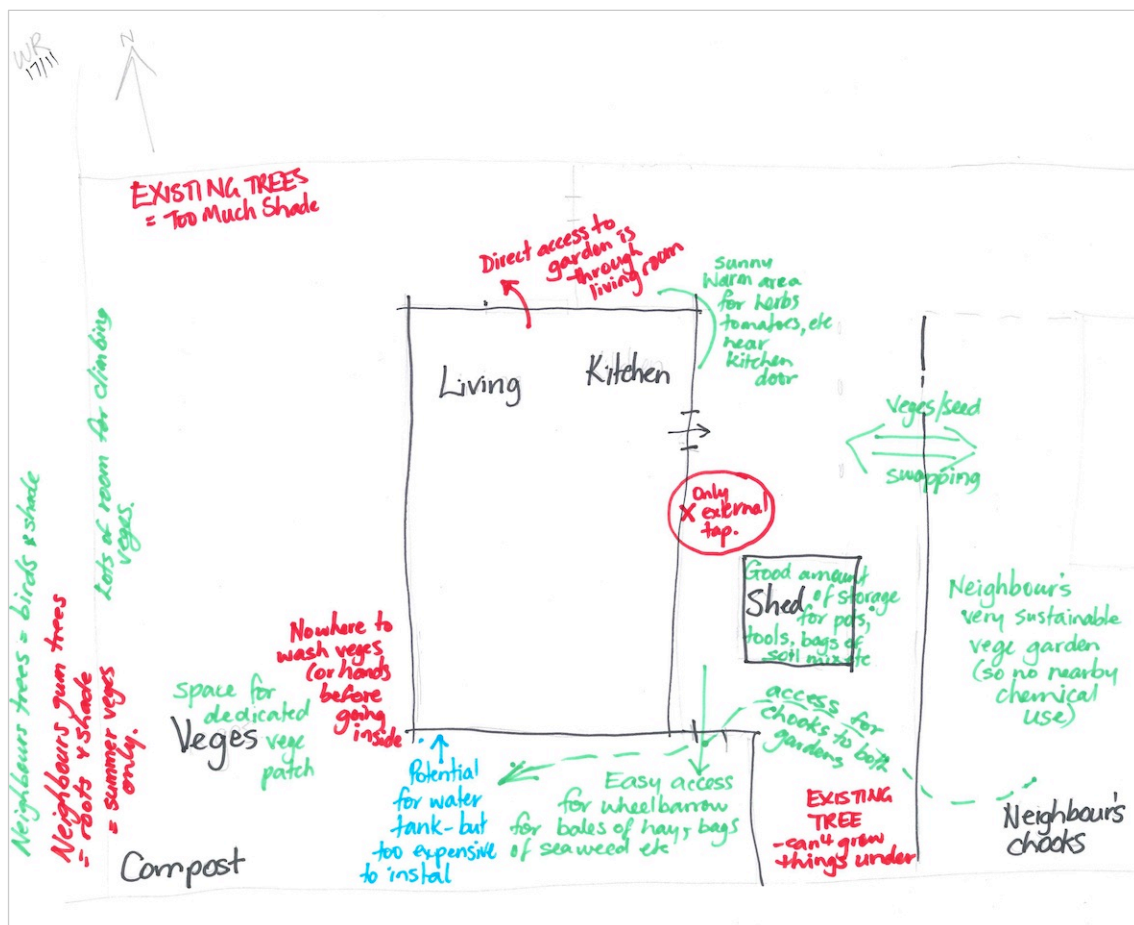


Figure 6.25: The spatial analysis of one participant with positive features indicated in green, and negative aspects in red

Reconsidering the outcomes of Activity 1 in relation to the social-ecological analysis of Chapter 5, the range of dilemmas expressed in Tables 6.3 and 6.4 reflect participants' expectations for a diversity of food choices year-round, routine consumption of products from overseas, and the option to cook different



cuisines. The dissonance this suggests frames the symbolic images introduced in Activity 1 as more ideal visions of sustainable food that are less straightforward for participants to achieve in practice. It is instructive to consider the stated spatial dilemmas as interacting with these kinds of personal and ecological dilemmas.

### Activity 3: Design speculations for facilitating ecological food production at home

In reflecting on the differentiated priorities assigned to scale throughout the workshops, I profile a range of participants' speculative design responses ranging from the scale of community and street, to the scale of the dwelling and adjoining neighbours, and narrowing to a focus on dwelling layout and the kitchen-garden interface. The design speculations from all three workshops have been considered as a combined set in this process, yet I remain mindful of the social contexts and concerns to which individual participants were responding in my accompanying discussion.

#### Community and street scale

Electing to write a specification for new housing subdivisions to foster community building integral to sustainable food and better support for ageing and disability, one participant set out two key requirements. The first is for smaller individual plot sizes with adequate sunny space retained for vegetable gardens (totalling 500-600 square metres). The second requirement is for shared gardening and social space for communal vegetable and fruit crops, children's play space, facilities for social events such as a barbeque, and a covered space with benches and seats for community projects such as food preserving and crafts.

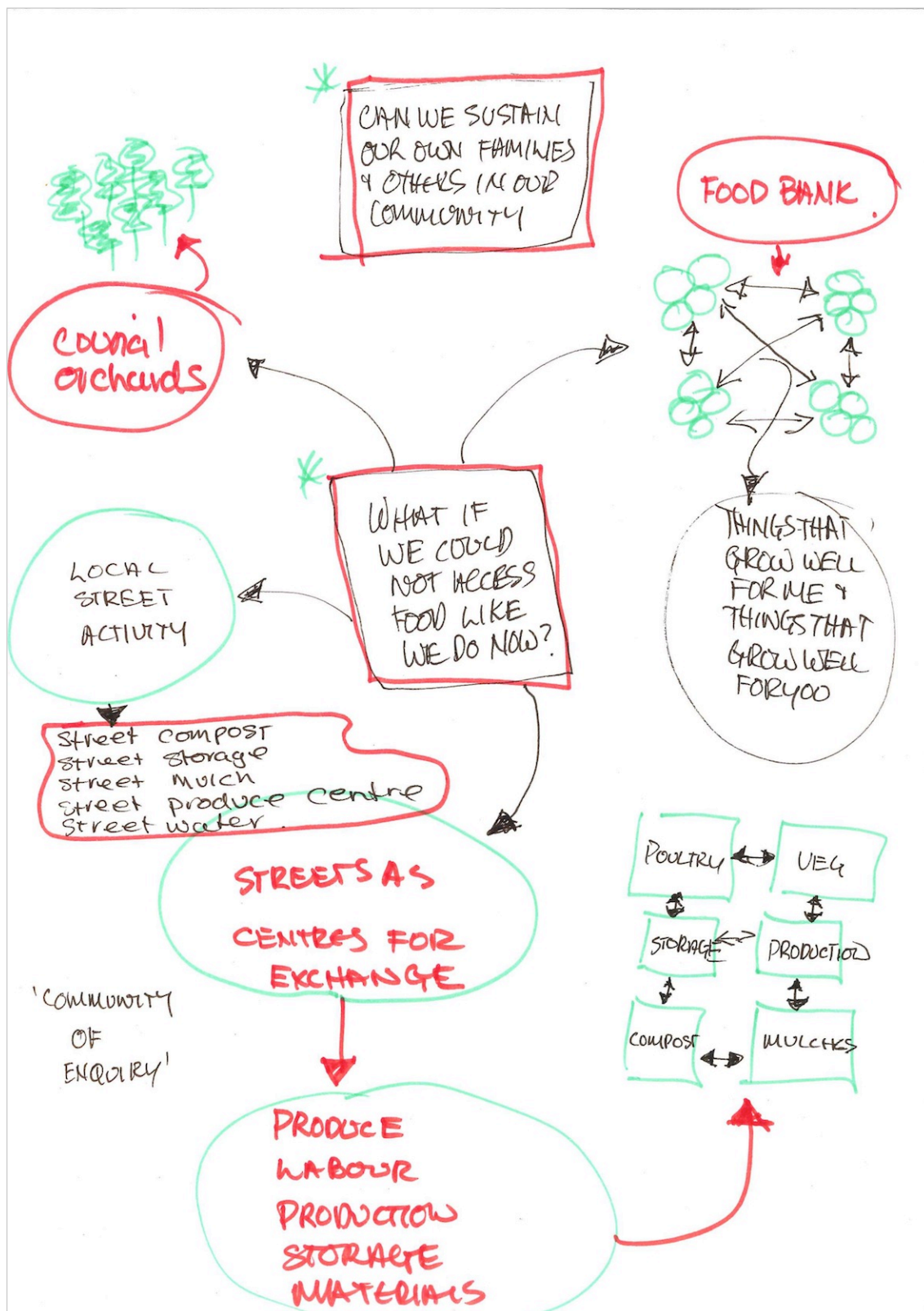


Figure 6.26: A food security proposal for urban streets as 'centres for exchange'

Choosing future food insecurity as her point of departure, another participant who is a long-term renter, envisioned streets as 'centres for exchange'. The sharing of produce, labour, production, storage and materials are identified in

Figure 6.26, and she highlights that compost and mulch, for example, are more efficiently produced at a multi-household scale. Also featured is a 'food bank' that leverages different properties' sun access, microclimates and soil types to produce a wider variety and volume of crops for exchange, and a more reliable food supply than individual households can typically achieve. These two cases emphasise both the infrastructure and the self-organising required for community-based food production, redolent of Manzini and Jégou's 'elective communities' (2003, pp. 81-83).

### The dwelling and adjoining neighbours

Adopting a similar exchange approach but at the scale of her immediate suburban neighbours, another participant's approach is contingent upon making existing property boundaries permeable as in Figure 6.27.

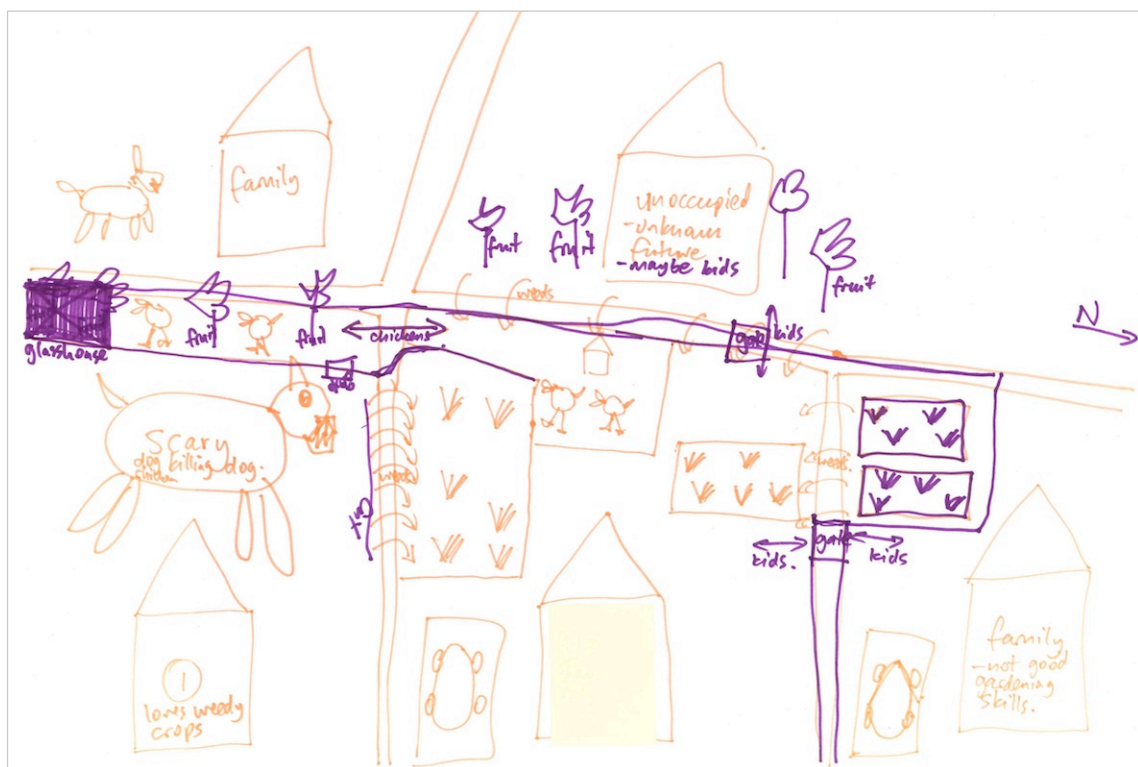


Figure 6.27: A proposal for complementary food production and skill sharing between neighbours

The various gates allow for shared access to a greenhouse, fruit tree crops and the services of chickens, along with safe movement of children between yards and the ability to lend help in a neighbour's garden. This continuity between productive spaces is redolent of Viljoen and Howe's (2005) CPULs outlined in

Chapter 2, applied at a smaller scale. This response also evokes the 'extended home' (Manzini & Jégou, 2003) which re-orders daily life through a combination of private, semi-private and public space. The participant acknowledged the high level of neighbourly cooperation that would be required, given her existing challenges with weed incursions and a neighbour's aggressive dog.

### Dwelling layout and the kitchen-garden interface

Taking a 'master plan' approach to the in-progress adaptation of her family's home, another participant emphasises the infrastructure needed to maximise food production including water tanks, grey water irrigation, utilising the house structure for vertical crops, adding drying racks to the existing deck and a potential greenhouse, as portrayed in Figure 6.28. This image represents the home's existing food axis in the manner intended by Collins Cromley (2010), but also reveals how the food axis is to be enhanced in the future. Also noted are desired improvements to the kitchen: more bench space, more storage space, a freezer and slightly bigger fridge, and an island bench for 'group cooking adventures', in the participant's words.



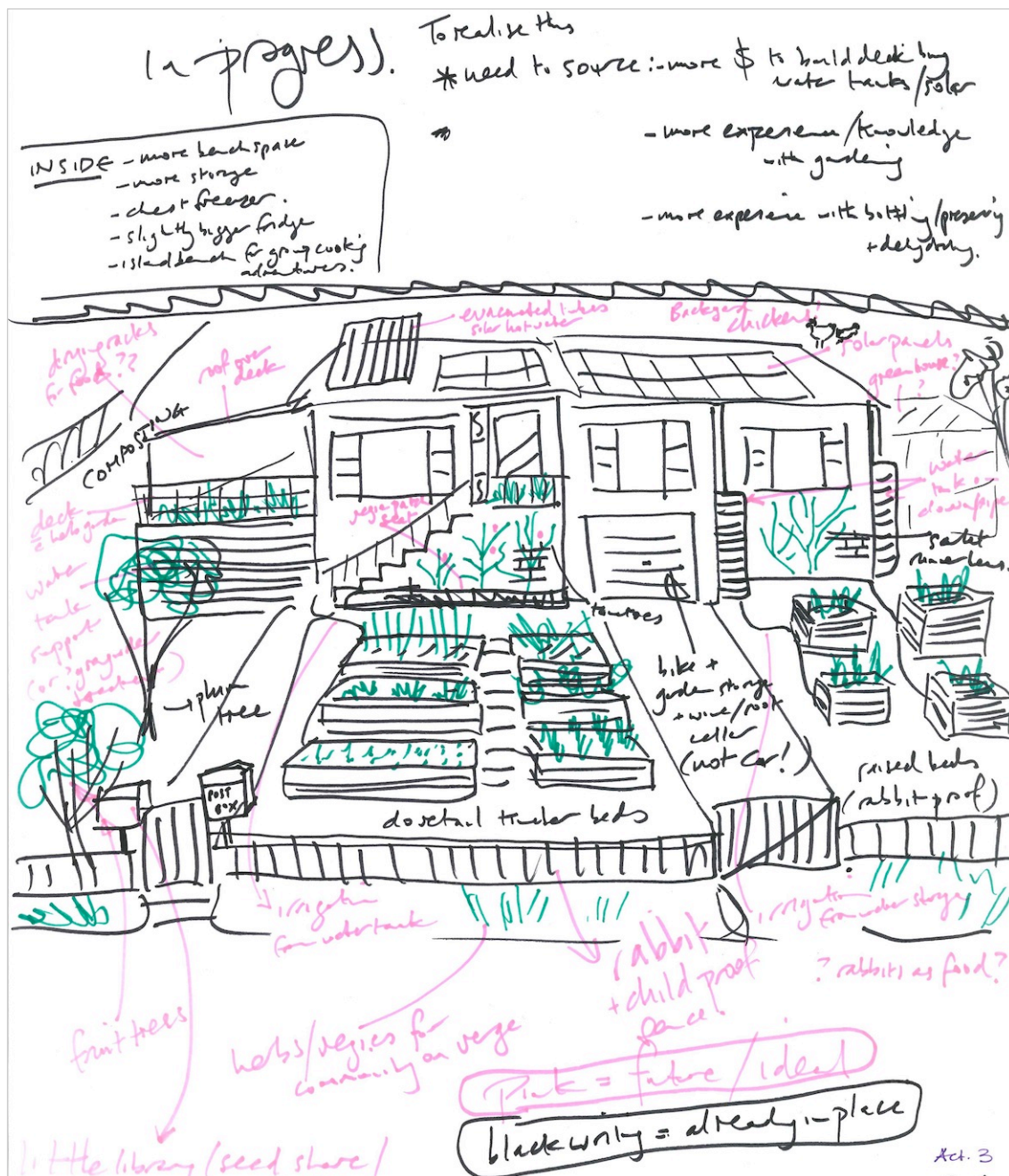


Figure 6.28: A 'master plan' proposal indicating existing food producing infrastructure in black, and ideal, future additions in pink

In the case of the small studio home (Suburban 2), the owner's response in Figure 6.29 shows how she resolves several dilemmas by utilising yard space that has become shaded by neighbouring trees to the north. The multi-use storage and covered work space doubles as a carport and features a workbench immediately beside the vegetable patch, with sink and water supplied by gravity feed from existing tanks under the elevated deck and house.

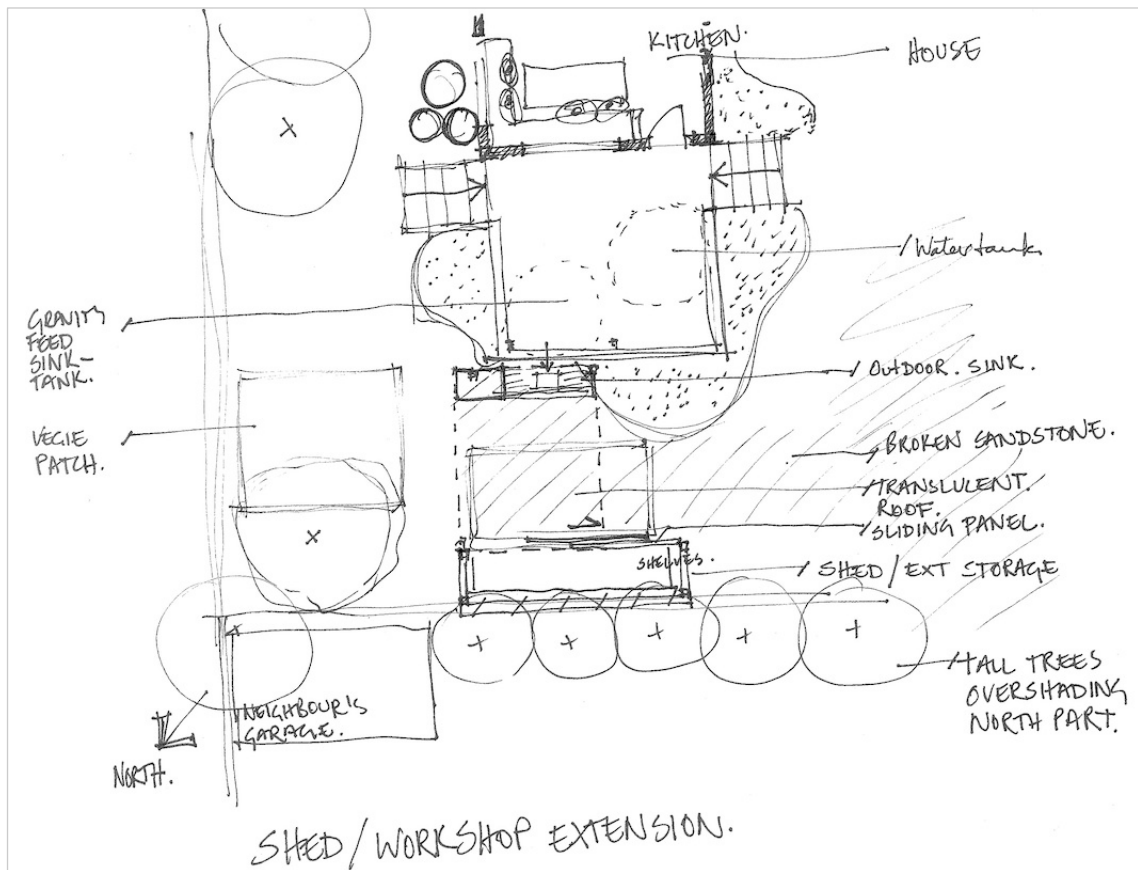


Figure 6.29: A proposal to use a now shaded part of the garden for a multi-use storage shed with an outdoor sink

In a similarly targeted design response, another participant mediates the disincentive to garden due to the black clay soil that gets trodden into the house. In Figure 6.30 she proposes a 'beautiful and functional' storage structure and boardwalk between the garden enclosure and entry to the house, incorporating shoe and tool storage. A further storage box is located beside the garden entrance for smaller tools and garden needs to better foster spontaneous gardening, highlighting the small interventions some saw as likely to impact positively their food growing practices.

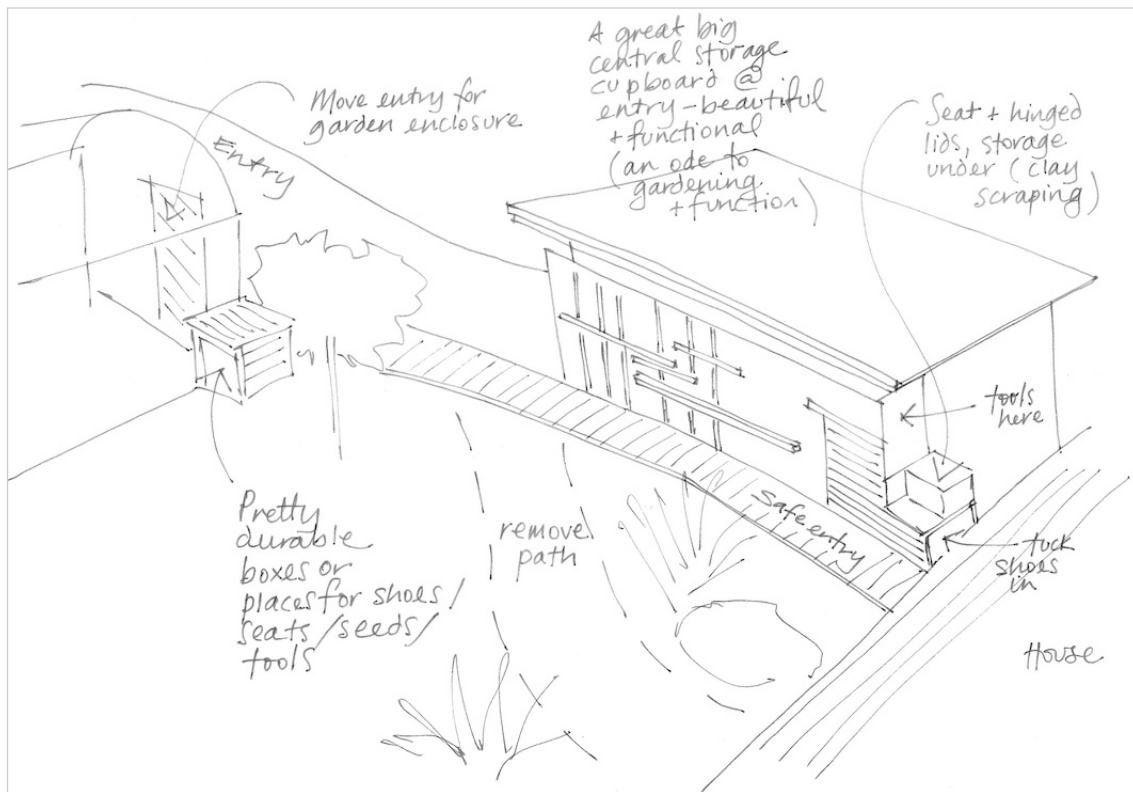


Figure 6.30: A proposal for combined garden storage and safer, entry boardwalk to prevent black clay soil being trodden into the house (re-traced by author from original pencil sketch)

Having recently adapted a farm building into a dwelling on her smallholding, another participant highlighted how she and her husband had maximised the affordances of orientation. The layout in Figure 6.31 employs passive solar principles with extensive glazing to the north, and ready access to an outdoor eating area and potted herbs to the east. The kitchen, large enough to accommodate helpers, is centralised in the sunny living space with the cool, southern spaces given over to storage and a roomy larder in the south-western corner that maintains an average 12°C in winter and 14°C in summer. Noteworthy is how the food axis has become disaggregated once more in the manner of pre-industrial settings with their low-energy imperatives, but signalling too that these passive design principles could be applied to the design of housing in higher density settings.

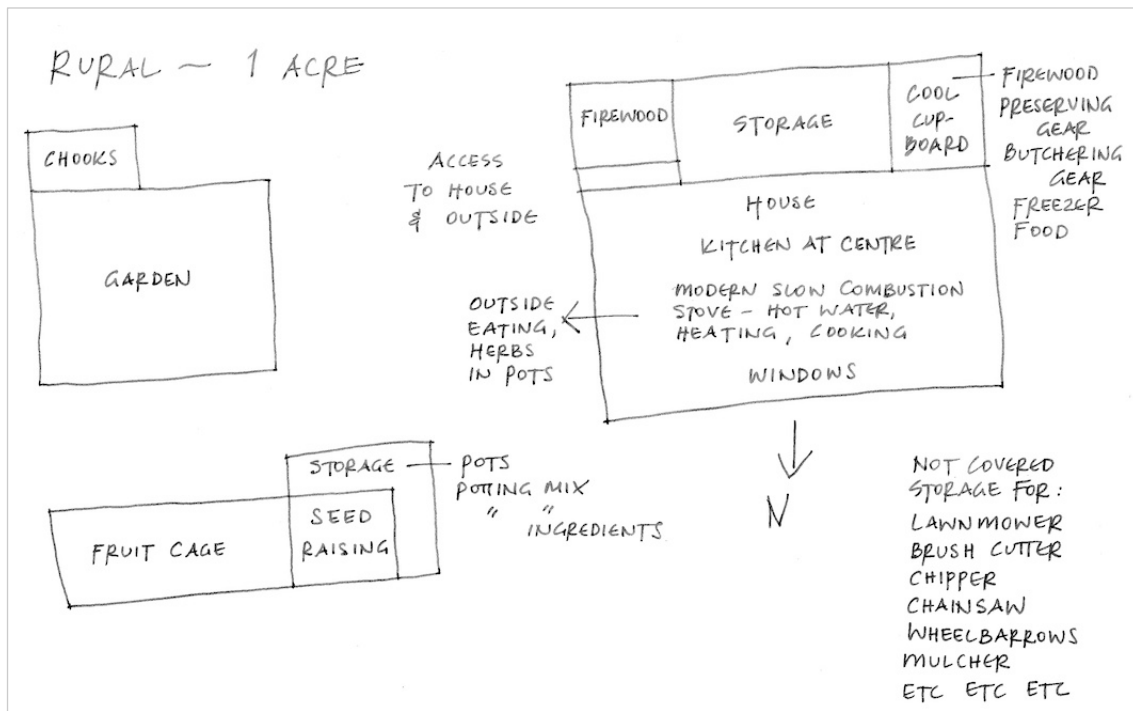


Figure 6.31: A sketch plan indicating the recent adaptation of a farm building utilising passive solar principles with a larder located on the southern side for year-round food storage (re-traced by author from original pencil sketch)

Proposing modifications to her suburban home, another participant addressed a lack of storage and the need for dedicated space for harvest processing and drying seeds for saving. In Figure 6.32 she has also included an earth cellar for storing potatoes and root vegetables under a new structure that creates a functional transition space between the garden and kitchen at the rear of the house. Even without the cellar, this example makes apparent how relatively low cost transitional porch-like structures can significantly enhance the functionality of the kitchen-garden interface.



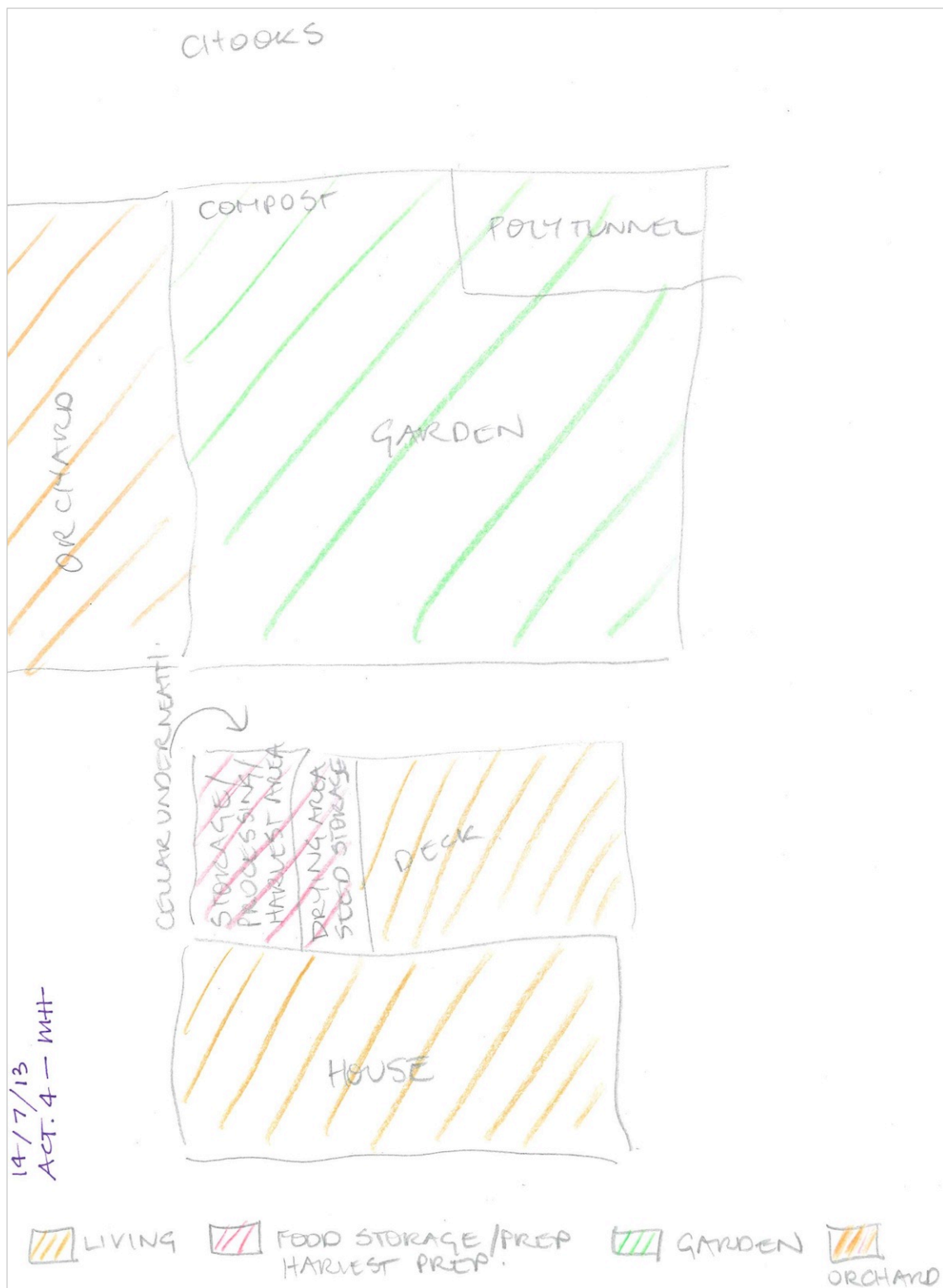


Figure 6.32: A proposed modification including an earth cellar and transition space for garden storage and drying seeds

The more specific proposal to follow redresses shortcomings the participant identified with her home in Activity 2 (Figure 6.25) and helps mediate the dwelling's direct access from garden to living room. The water tank and bench structure illustrated in Figure 6.33 provide a water supply within the productive

garden, with water able to be cycled directly from the sink back to the garden. The structure includes storage and is covered to allow work-in-progress to be left in place and resumed when time allows, a high priority for the participant, along with the ability to wash hands and vegetables before entering the house.

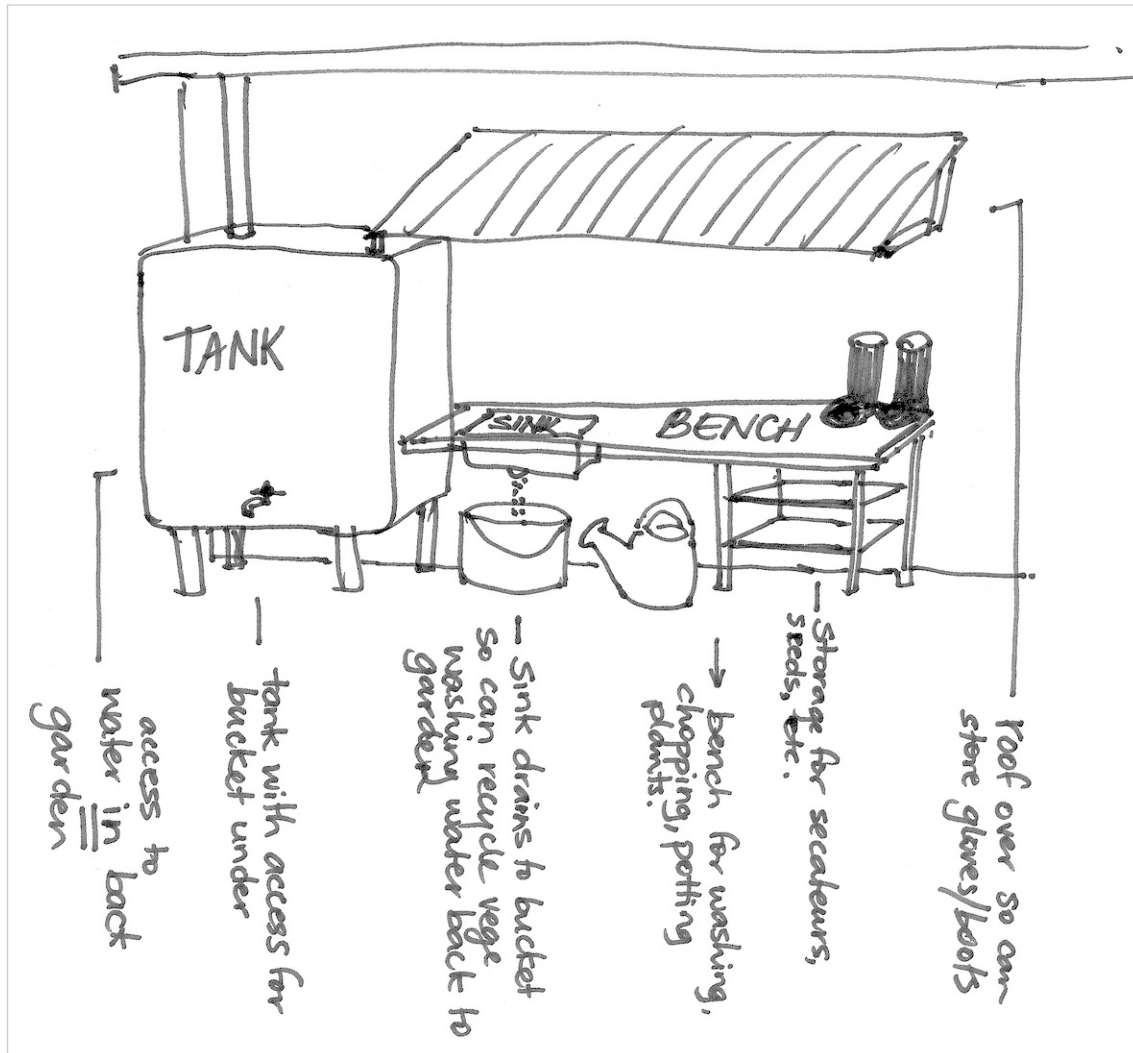


Figure 6.33: A proposal for a bespoke combined water tank and covered garden workbench

This rich range of scalar and practice-informed design speculations illuminate several foci for further design exploration that I seize as the conceptual basis of Chapter 7. Below, I summarise this phase of the research design by making key observations on the outcomes of the participatory methods.

## 6.5 Phase 3 summary

In sum, the design speculations of workshop participants simultaneously respond to sustainable living goals, family needs, desired social interactions, and pragmatic concerns such as storage and access to tools, sun access, water, energy and nutrient cycling, while also fostering biodiversity and habitat for wildlife. The range and extent of speculation presents challenges to several design norms in housing, such as orientation and spatially-manifested assumptions about mainstream food provisioning. These factors were felt keenly by those who are constrained in their ability to make adaptations to their home, resulting from rental tenure or for want of resources. The many purposeful adaptations made by householders and documented during my household visits form the basis for further speculation in the following chapter. The diverse understandings of 'sustainable food' elicited in the workshops translate into diverse food producing practices that manifest spatially and materially in conceptions of the dwelling. These are complemented by wider conceptions seeking to optimise systems and expand food production in spaces interacting with and beyond the dwelling.

### Synergies with broader sustainable living approaches

The outcomes of all three workshop activities reveal the synergistic role home-based food production plays in relation to broader sustainable living approaches. The imperative of sustaining a garden while minimising external inputs places a premium on water and nutrient cycling, for example, such that 'waste' is prized by participants. There is rarely enough kitchen waste to be transformed by wormfarms and compost bins. In the context of urban food production, Mobbs (2012) highlights the role of café and restaurant organic waste for increasing compost production. The practices of bulk food provisioning and preserving also markedly reduce packaging waste. Overall, the home-based infrastructure needed to produce food assigns a heightened value to a raft of used materials by householders.

These imperatives and practices contrast sharply with the 'green counterpart' approaches to sustainable design I highlighted in Chapter 5, however, increased interest in food-producing at home has clearly spawned new markets

and commodities. Among these are the 'grow bags' and off-the-shelf equipment featured by Chris McLaughlin (2013) in his practical guide to vertical gardening. Such products may prove enabling, as Naidoo (2011) attests, but along with commercial garden inputs they do not promote the ecological, systems-based approaches most workshop participants articulated through their design responses.

## Challenging housing norms

At the scale of dwellings and their interface with gardens, a lack of storage and functional transition spaces was a recurring theme, along with great value accorded to indoor sunlit spaces such as windowsills for seed raising and ripening produce. The common conflation of the contemporary food axis that Collins Cromley (2010) pinpointed, in which kitchens offer limited pantry cupboards but capacious fridge-freezers, aligns poorly with the practices of preserving, bulk-provisioning and low energy storage. The currently ubiquitous island bench is, on the other hand, quite vindicated on functional and social grounds for group cooking and food preserving tasks. The more intensive practices of smallholders, such as butchering animals, cheese- and soap-making, are not necessarily limited to rural settings based on this set of practices tied to household settings. In their practical guide to self-sufficiency, Strawbridge and Strawbridge (2010) underscore that suburban food production can be as potentially intensive as that of a rural smallholding, signalling that suburban ecological food practices should be anticipated to be wide in scope from a housing design perspective.

While not explicit in the examples featured, workshop discussion also touched upon the disappearance of utility rooms, which in late twentieth century detached housing were often adjacent to kitchens, and with external access. In higher density housing this function is now frequently replaced by a laundry cupboard or bathroom equipped with a washing machine (European-style communal laundries not having made inroads in Australia). At risk of suggesting dwelling areas need to swell further, given that Australian detached houses are among the largest in the world (Dowling & Power, 2012), a design commitment to facilitating food production at home demands questioning housing typologies and norms and *re-evaluating* space and spatial order. In the following chapter, I

propose such spatial re-evaluations, while cognisant of how domestic space simultaneously fulfils other crucial cultural and interpersonal functions.

## Ideals and new dematerialised design spaces

Throughout both Phases 2 and 3 of the research design, the practices of food growing and gardening evinced by participants were also an important affective engagement with nature and natural systems. As noted, some participants were seeking to enhance biodiversity and wildlife habitat as a more collective ecological contribution surpassing their own needs. This resonates with the 'biophilic' practices and lifestyles that Timothy Beatley and Peter Newman (2013) argue should be fostered in urban populations in order to bolster the resilience of cities. Also spanning a range of scales, Beatley and Newman suggest that biophilic urbanism can contribute to enhanced food security.

Food security and biophilic urbanism intersect with the emphasis placed on food production at the community scale in the workshops. Participants' responses resonated with the ideological shift apparent in *Carrot City* (Gorgolewski, Komisar & Nasr, 2010) and April Philips' (2013) urban agriculture design work, in which communities mobilise around growing food. The design speculations addressing this scale express a discernible idealism, by extension challenging existing social relations. Having served as the president of my local sustainable living group which incorporates a food cooperative and CSA program concurrent to these research phases, I concede that my own idealism on this point has been somewhat tempered. Relevant to this discussion, is the extent to which community scale food production is contingent upon dematerialised design: operational and governance strategies, volunteer coordinating systems, and network development. These examples represent significant 'invisible' design work in essential interplay with the material and spatial infrastructure of community food. This is recognised by Philips in the focus she assigns to the design of lifecycle operations for urban agriculture (2013, pp. 186-191), and underscores that dematerialised design processes are an intractable feature of social-ecological design.

## 6.6 Conclusion: Design meta-brief for regenerative food axis patterns

The outcomes of these participatory methods, their subsequent elucidation of ecological food practices and corresponding design speculations lend weight to my argument in Chapter 5 that the home needs to be reconceived as an ecological agent. In response to the second research question, the fit between ecologically literate food-producing practices and dominant housing typologies is not generally facilitative. The extent to which participants had already undertaken adaptations to their homes in support of their food producing practices reinforces this claim. Participants' speculative responses signal the immense opportunity latent in domestic and community settings for the fit to be greatly enhanced through design, and particularly participatory design. Suggested in these outcomes are ways such ecological agency can be developed from the granular scale of a larder to the broader scale of a city farm and its interactions with households and other entities such as schools and healthcare providers.

I conclude the chapter by formulating a design meta-brief that foreshadows my deeper exploration, integration and iterative design process in the following chapter. The meta-brief is the first step in my response to the third research question, and guides the process of social-ecological design research in proposing regenerative kitchen-garden systems as an urban resilience strategy. The brief's conception borrows from *A Pattern Language* (1977) by Alexander, Ishikawa and Silverstein, adopted as the groundwork for subsequent food axis design patterns informed by social and cultural practices, but sufficiently open to interpretation and contextualisation in specific settings and at a range of scales. A number of the original patterns align with the outcomes summarised in Section 6.5. These include the farmhouse kitchen (Pattern 139); cooking layout (Pattern 184); sunny counter and open shelves (Patterns 199 and 200); and vegetable garden and compost (Patterns 177 and 178) (Alexander, Ishikawa and Silverstein, 1977). The scope of the design meta-brief takes in the dwelling set within a community, and its interface with productive garden space, consciously disaggregating the food axis once more to facilitate the ecological food practices documented throughout this chapter.

## The design meta-brief

Taking a scalar approach beginning inside the dwelling, these textual patterns forming the brief should be considered as an integral suite to inform iterative ideation cycles:

- Provide adequate storage for fresh and preserved foods, divided between a shallow-shelved pantry within or near to the kitchen, and a larder that makes use of cooler zones in the dwelling resulting from its orientation or structure;
- Provide storage for food-producing equipment, divided between that frequently used in the kitchen and that used infrequently, both within vermin-proof zones of the home.
- Conceive of the kitchen as a space for process-based cooking, for tasks involving more than one person, and for social activities, constructed from robust, enduring, ecologically principled materials.
- Design for accessibility and ageing, with visual connection to productive space.
- Provide systematic waste sorting for organic and other waste for ease of cycling back to the compost, wormfarm and potentially animals, and for off-site recycling.
- Connect the kitchen to a utility room that can also perform the role of scullery, and potentially facilitate storage and waste-sorting as above. Highly serviceable flooring and surfaces are integral to this connection.
- Provide a waterproof windowsill or window shelf with prolonged sun access for seed raising, ripening and sprouting, and for growing leafy greens and herbs at higher densities. The kitchen is an optimal location for maximising use of the windowsill as it is observed frequently and water is at hand.
- Link the kitchen and garden via a transition space, ideally covered, with a workspace and water supply that can also be used for outdoor social activities and projects.
- Provide an outdoor eating space that can double for seasonal food-producing projects, potentially linking with the transition space.
- Enable householders to plant zonally (as per permaculture principles) with leafy greens and herbs closest to the kitchen, and a mix of plant

types including pollinator attractants and endemic, drought-resistant species for biodiversity and wildlife habitat.

- Provide for maximal water harvesting, storage and recycling subject to local authority regulations, with tap access within the productive space.
- Provide external access to the productive space where possible for inputs such as community-sourced compost and mulch, and reclaimed building materials.
- Assure year-round sun access in siting the dwelling to provide potential productive space for householders, including walls and fences.
- Consider opportunities to connect neighbourhood productive spaces and factor in the role of community and regional food production in regenerative food systems.

The regenerative food axis design patterns I propose in the next chapter are book-ended by exploration and discussion of two key themes to emerge from these richly informative participatory methods. The first is the resurgence of homecraft as the enactment of everyday sustainable living by householders, along with its spatial significance. The second theme expands upon the adaptations made by householders to their domestic environments and the social networks out of which such action arises. I interpret both themes as forms of design for resilience with potential to support Brandt and Lonsway's (2012) potent notion of the 'adaptive re-use of the suburbs'. The food axis design patterns to follow begin to frame how housing and kitchen-garden types might be re-visioned through design for resilience.



## Design for resilience at home: Design iterations

### 7.0 Introduction

This chapter extends the process of research through design initiated within the participatory design workshops detailed in Chapter 6. The design iterations of this chapter also integrate the Phase 1 social-ecological analysis, and the outcomes of my co-engagement in participants' food producing practices in Phase 2. Directed by the design meta-brief at the close of Chapter 6, I propose regenerative kitchen-garden systems as an urban resilience strategy, in direct response to the third research question. In the design iterations featured in Section 7.3, I devise and apply regenerative food axis patterns at a range of housing scales, informed by participants' insights and design speculations from the preceding phases. These design patterns, as I established in Sections 4.5 and 6.6, are the result of a conceptual merger between the design patterns of Alexander, Ishikawa and Silverstein (1977) and the food axis proposed by Collins Cromley (2010). With a goal of maximising the regenerative capacity of kitchen-garden systems, I articulate sets of ecological food practices corresponding to each food axis pattern proposed, ranging from high-density through to peri-urban scales. Unlike the original pattern language, the design patterns are intended as discursive artefacts rather than spatial-material archetypes, reflecting the diversity that contributes to adaptive capacity from a resilience perspective. A parallel in the study of food, are recipes themselves,

understood particularly as the kind of ‘syntax’ Michael Pollan (2013) identified in the process of stew-making, highlighted in Section 5.1.

The theoretical grounding for the design iterations in this chapter emphasises three key outcomes from the Phase 1 social-ecological analysis. Extending the concept of material agency, I frame the home as an ‘ecological agent’, seeking opportunities for it to facilitate and validate ecologically literate practices. This represents a formative step in attempting to evolve the pre-figuring nature of the home, in line with Fry’s (2009) contention that the outcomes of design shape *habitus*. The second outcome deploys the food axis not only as a tool for mapping the food-related components of the home, but for actively maximising regenerative capacity via synergistic relations between components. The third outcome of the analysis is my appreciation of alternative food practices as interwoven cultural, health-aware, ecologically literate and personally significant activities. This outcome was further strengthened and enriched by the household ethnography and participatory design responses that followed. While targeting regenerative food systems in the design iterations, I remain alert to these multiple meanings, and the diverse demands imposed upon the home by the social context in which it is situated.

I develop this theoretical grounding within the chapter by exploring and discussing two emergent themes which book-end the design iterations. In Section 7.1, I position participants’ food-producing activities, revealed in Phases 2 and 3 of the research design, within a wider embrace of homecraft practices. Resurgent homecraft and making practices are discussed as the enactment of sustainable living and resilience strategies. Exploring the spatial-material implications of homecraft and making, I propose a ‘workshop logic’ for the home, to help foster regenerative household practices. Approaching resilience from a second angle in Section 7.4, I consider how the ‘adaptive re-use of the suburbs’ (Brandt & Lonsway, 2012) might be activated by an ecological design practice that leverages living labs, authentic models and grassroots networks. In concluding the chapter, I return to the issue of transferring and applying this new design knowledge, foreshadowing the practice-focused design framework to follow in Chapter 8.

## 7.1 Wider homecraft practices and making space for making

The focus of the participatory methods analysed and documented thus far has centred upon householders' food producing and provisioning practices. Yet many of my interactions with householders and their domestic environments unveiled a far richer array of home-based making practices. Food-related practices – growing, seed saving, preserving and storing food – emerged as integral to other homecraft practices including brewing, soap making, furniture making, spinning, knitting and sewing. Craft-based re-purposing projects also featured strongly with reclaimed materials such as hardwood, stone, ironwork and steel all coveted for transforming into garden beds, trellises, chicken coops, drying racks, compost bays and robust benches and shelving. Mindful of a wider, popular resurgence of the crafts, I set out to explore resurgent homecraft in relation to sustainable living agendas, and to question what its nexus with everyday design practices might auger for the spatial ordering and materiality of housing from an ecological design perspective.

The popular resurgence of the crafts and its meanings in North America, Europe and Australasia has warranted both mainstream media and scholarly attention. Previous craft revivals – of the 1970s and the earlier Arts and Crafts Movement – have been critiqued as “an idealistic retreat to a nostalgic and romanticized version of the past” (Peach, 2013, p. 174). The contemporary craft revival is distinctive for its concern for the future, in historian Andrea Peach's (2013) analysis, revealing themes of global justice, environment, individuality, humanity and the primacy of natural materials. Discussing what they term ‘fabriculture’, Jack Bratich and Heidi Brush (2011) distinguish between craft as social activism and more prosaic forms of revived do-it-yourself craft. Craft as activism according to these authors, has merged with third wave feminism resulting in ‘craftivism’, as coined in 2003 by knitter Betsy Greer (American Craft Council, 2012). Defining ‘indie craft’ from an Australian standpoint, Emily Howes suggested it “challenges the mainstream industrialised modes of manufacturing, production and consumption of material goods while at the same time celebrating an enjoyment of materiality” (2009, p. 150). Howes highlighted too that indie craft re-works craft traditions into contemporary popular culture, often

ironically and self-referentially. Common to craftivism and indie craft, is their extension into online communities, blogs and websites where made objects are showcased and discussed, patterns and skills shared, and materials acquired.

Among the householder participants in this study, traditional crafts such as making functional household goods and mending were most frequently expressed as the logical enactment of sustainable living, merging in several cases with a necessity for thrift and a desire to opt out of mainstream consumption. Writing on do-it-yourself (DIY) activities in relation to the specialised and often abstract nature of our work roles, and typically passive consumption, Michael Pollan makes this observation:

I doubt it's a coincidence that interest in all kinds of DIY pursuits has intensified at the precise historical moment when we find ourselves spending most of our waking hours in front of screens – senseless, or nearly so. ... To join the makers of the world is always to feel a little more self-reliant, a little more omnicompetent (2013, p. 407).

Strong expressions of meaning, value and fulfilment were also attached to making and re-making, especially in relation to gifting and exchanging with likeminded others. Several householders were also actively gaining making skills, citing a limiting loss of know-how between their grandparents' generation and their own. On this point, the enabling role of digital technologies came again to the fore, with websites, blogs and how-to videos consulted frequently for guidance. Partners were also enlisted for making projects, and as noted in Chapter 6, the majority of householder participants were female, such that male partners lent traditionally masculine skills such as welding and larger-scale woodworking. This localised gender pattern aligns with Bratich and Brush's (2011) claim for amateur craft being highly feminised, arguably more so than food and cooking based on the commentary of Meah (2013) and Pollan (2013). The increasingly nuanced food roles they suggest appear to result from factors including the organisation of work, diverse household structures and carer roles, in addition to the popular interests of social collectivities and individuals.

Household making practices and collectives of skill are also recognised within self-sufficiency and Transition movements (see Section 2.1) that seek to foster self- and community-efficacy as a fundament to social resilience (Hopkins, 2008; Mobbs, 2012; Strawbridge & Strawbridge, 2010). As with alternative food systems, re-localising the making of essential goods and re-activating manual skills are ways of dismantling our dependency on fossil fuels and distant supply chains. The ability to sustain ourselves with limited materials and supplies is also becoming increasingly relevant in times of crisis arising from major storms, floods and bushfires. In the remainder of this section I propose how ecological design centred on the home could engage productively with homecraft and everyday design as key threads in building household and community resilience.

### Valuing everyday craft and design

Writing on craft knowledge and skill, art and design theorist Peter Dormer (1994) celebrated the everyday design that occurs *through* making at the scale of the home, for example in building or renovating a house, boat or car. Sociologist Richard Sennett (2008) also upholds the unsung but significant craft bound within daily routines of parenting and cooking. Dormer highlighted too a traditional merging of craft and design in the making of the craft workshop and its tools by craftspeople (1994, p. 91). Across the households in this study, I observe the significant adaptations made to the domestic environments, inside and outside, as processes of shaping a craft workshop and the ‘tools’ necessary for householders’ ongoing making projects integral to living more sustainably. This craft practice and workshop analogy intersects fruitfully with Björgvinsson, Ehn and Hillgren’s (2012) participatory design tenet of design-after-design that involves users – householders in this case – in further adaptation and refinement of their domestic environment. I do not mean to suggest a careless lack of design resolution but rather what Sennett terms “a positive embrace of the incomplete” (2008, p. 430) that credits householders with the potential to be ecologically aware crafters and designers of their living environments.

In application to housing design, this would entail questioning assumptions about what householders *consume* and *do* at home, and evaluating what is

desirable for our collective, social-ecological good. In order to avoid foreclosing on or proscribing ecologically aware practices, one can think of this as a conceptual zone of in/determination in which designers are reflectively conscious of what is being determined spatially and materially and what is not, relative to targeted practices. This approach employs the 'soft tactics' urged by Tatjana Schneider and Jeremy Till (2007) in relation to flexible housing design. Prioritising sun access to courtyards and balconies, for example, invites the creation of productive spaces and other activities. Further, providing waste sorting and composting facilities would help to normalise these practices. Flexible, multi-use storage and work spaces invite making practices and the ability for householders to maintain work-in-progress but they do not *prescribe* such practices. Similarly, the provision of utility rooms does not demand that householders adopt food preserving and grow mushrooms there as Indira Naidoo (2011) does, but neither does it foreclose on the possibility. It is incumbent upon ecological housing design to make space for, and invite such manual, skilful, regenerative making.

### Making space for making

Making space for making is therefore simultaneously conceptual, spatial and material. Based upon my involvement with the 12 households and their subsequent design speculations, the collective desire was for the home to function according to what I have come to view as a 'workshop logic'. The home can maintain its affective and symbolic significance to householders while simultaneously fostering ecologically literate practices through spatial-material means. In the context of this study, householders prioritised their sustainable living practices as an extension of identity and values. In my interpretation, this frees them from 'preciousness' about the home's outward image. Such pragmatism resonates with the renewed head-heart-hand convergence urged by craft advocate Frayling (2011), and the necessary confluence between a maker's practice, tools and workshop expressed earlier by Dormer (1994).

A domestic workshop logic runs counter to the pervasive logic that is symbolised by the proliferation of gadgets that seek to replace domestic making practices, the conflation of workspaces into furniture, and the globally exported flat-pack kitchen. The flat-pack kitchen, as I have critiqued elsewhere, is rooted

in the logic of global capital, addressing foremost problems of engineering, modularity, replicability, logistics and distribution. The 'craft' of making is transferred to the consumer who completes a two-dimensional to three-dimensional transformation through do-it-yourself assembly (Fountain, 2014). The resultant flat-pack kitchen carries with it privileged practices such as dimensions for modularised appliances with particular functions and a materiality best matched with meal kit assembly – or flat-pack logic applied to food.

## Embedded crafts and household resilience

Deploying gadgets and assembling flat-pack kitchens, furniture and other household items, it could be argued, have become contemporary 'craft' skills in the context of mainstream production and consumption. The ecological costs are evident however, as I argued in Chapter 5. Less obvious is the relationship between what I term the 'embedded crafts' of household making practices and levels of household resilience. Reiterating Sennett's discussion of tacit knowledge, he captured the nature of these embedded crafts in describing "the thousand little everyday moves that add up in sum to a practice" (2008, p. 77). Self-efficacy at home – growing food, making bread, mending clothes and re-purposing objects and materials – is contingent upon such unspoken, uncoded, habitual and embodied knowledge. Housing designers and dwellings cannot of course bestow this know-how and craft skill upon occupants, but it can recognise that fostering them are critical threads in the future resilience of households and communities. In my subsequent design iterations, I address how this conception might manifest spatially, integral to designing for regenerative food systems.

## 7.2 Mapping a regenerative food axis: The 'living lab'

My recently built home, introduced in Chapter 3 as a 'living lab', was designed within tight budgetary constraints as a system in support of food growing, harvesting, low energy cooking, preserving and storing food. Based upon passive solar principles, the house was also designed to utilise local, renewable materials as far as possible, use minimal energy in operation and cycle all water and waste on site. The house and its systems are subject to ongoing refinement

with, for example, a rooftop solar array yet to be installed in order to become a net supplier of energy to the grid. I have conceived of the house as a food sub-system interdependent with the local and regional food systems in which it is located, rather than a closed loop or self-sufficiency model. I therefore participate in the local CSA scheme to supplement home produce and my food choices are largely determined by what is available at the local whole food coop. This approach is in recognition of the interconnections underpinning resilience in social-ecological systems and the circumstance of living in a productive and diverse food region.

In this section, I map the food axis of my home in the retrospective manner Collins Cromley (2010) intended. The aim of the exercise however, is to identify key food axis components to then re-order iteratively, and evaluate for their applicability to other urban scales and housing densities. This initial mapping process also serves as a means of testing and refining my representation methods. On this point, my priority is for flexible, loose methods that support immediacy and reflexivity in order to work in a dialogue with the theory I have already generated, and continue to generate out of the process. I am conscious that while computer-based visualisation would result in a professional-style presentation, it would not strengthen the veracity of my ideas and would add an additional cognitive layer to the process. In selecting representations for inclusion, I have sought foremost to make the design process and my ideation accessible and comprehensible. This mirrors the immediate and expressive quality of the participants' sketches included in Chapter 6.



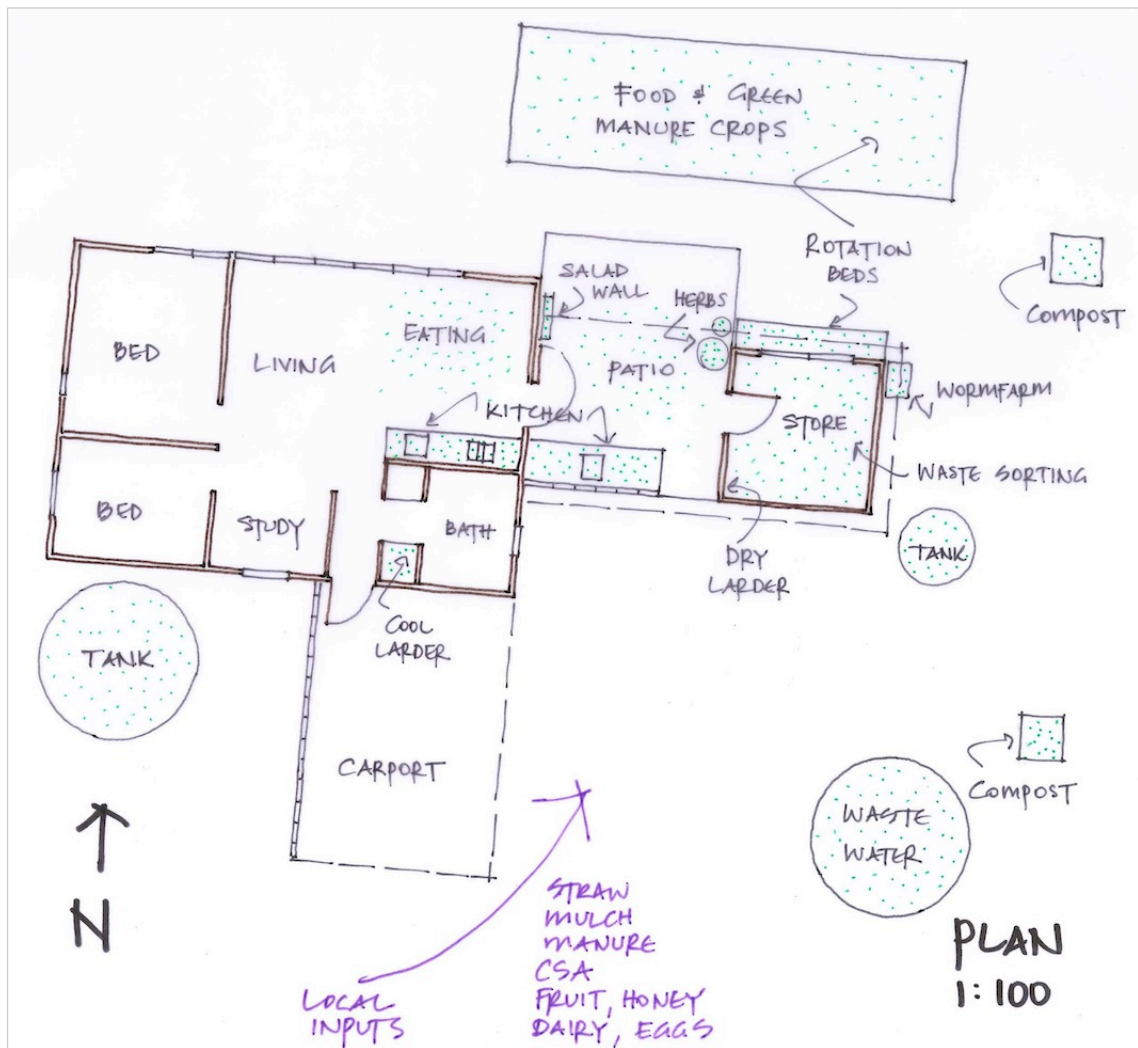


Figure 7.1: Mapping the food axis components of my home, the 'living lab', and identifying inputs

In Figure 7.1, the original plan view is annotated to identify the components of the food axis, shaded in green, including community-sourced inputs essential for the garden and my provisioning. In so doing, the limits of my sub-system become apparent, highlighting the dependencies determining its current regenerative capacity.

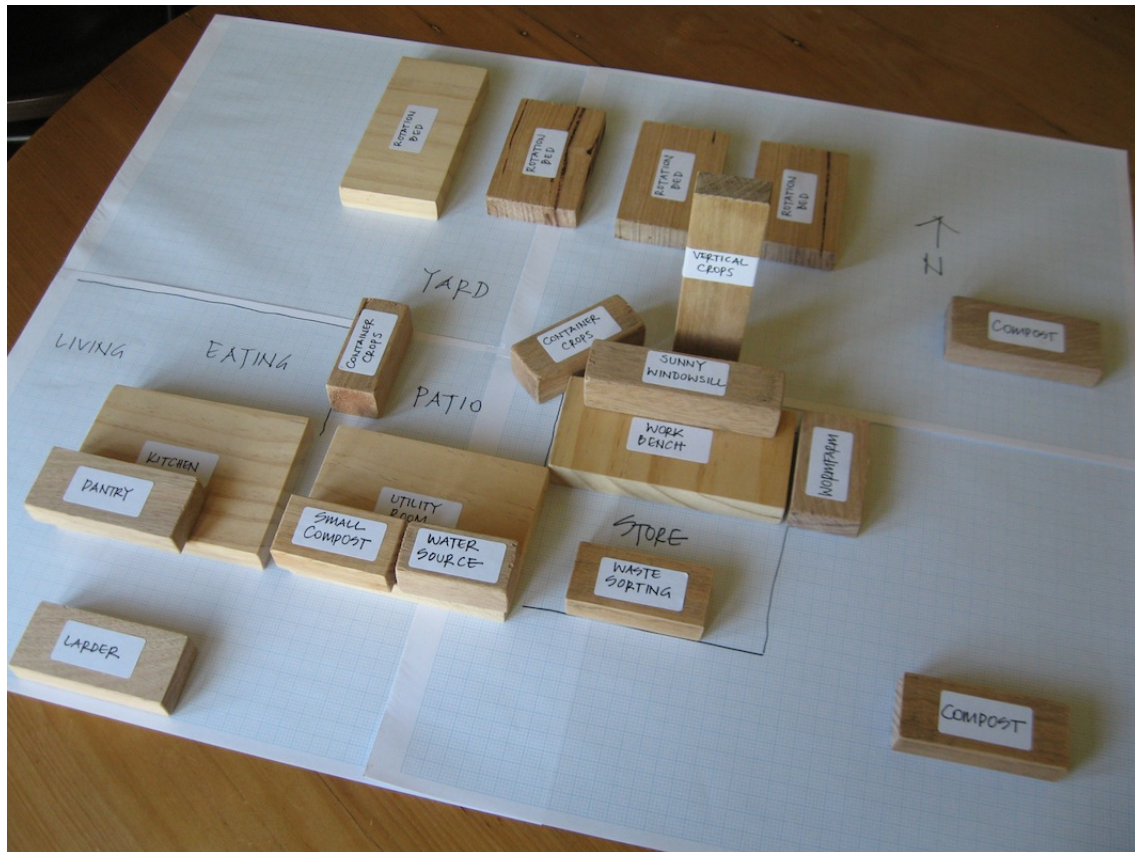


Figure 7.2: The food axis components of my home represented as a schematic

While the food sub-system was the primary organising principle for the layout, the small footprint (totalling 98 square metres under roof including patio, store and carport) is designed for multiple functions. The transition patio space which bridges the house and store serves as outdoor kitchen, utility room and a much-utilised space for a range of making and mending projects, with easy access to tools and materials. Focusing on the food axis components and their relational arrangement, Figure 7.2 is a schematic representation of the food axis of the house and all the spaces and infrastructure involved in my food practices. To illustrate key features of the house and its productive spaces, a small selection of images is included as Appendix C, photographed during the summers of 2012-2013 and 2013-2014.

While the representation method in Figure 7.2 uses simple, labelled wood blocks and provides less detail than the annotated plan view in Figure 7.1, it provides a ready means of capturing the *relational* pattern of the food axis. It also lends itself to consideration of vertical space. Such a pattern could in turn become the basis for further speculative layouts, relative to contextual factors

and needs. The compact overall footprint of the house and its productive spaces from which the food axis pattern is derived is applicable, for example, to the design of medium-density housing settings requiring similarly small footprints. Variants on this schematic could be achieved on as little as 250-300 square metres, assuming favourable orientation, setbacks and sun access.

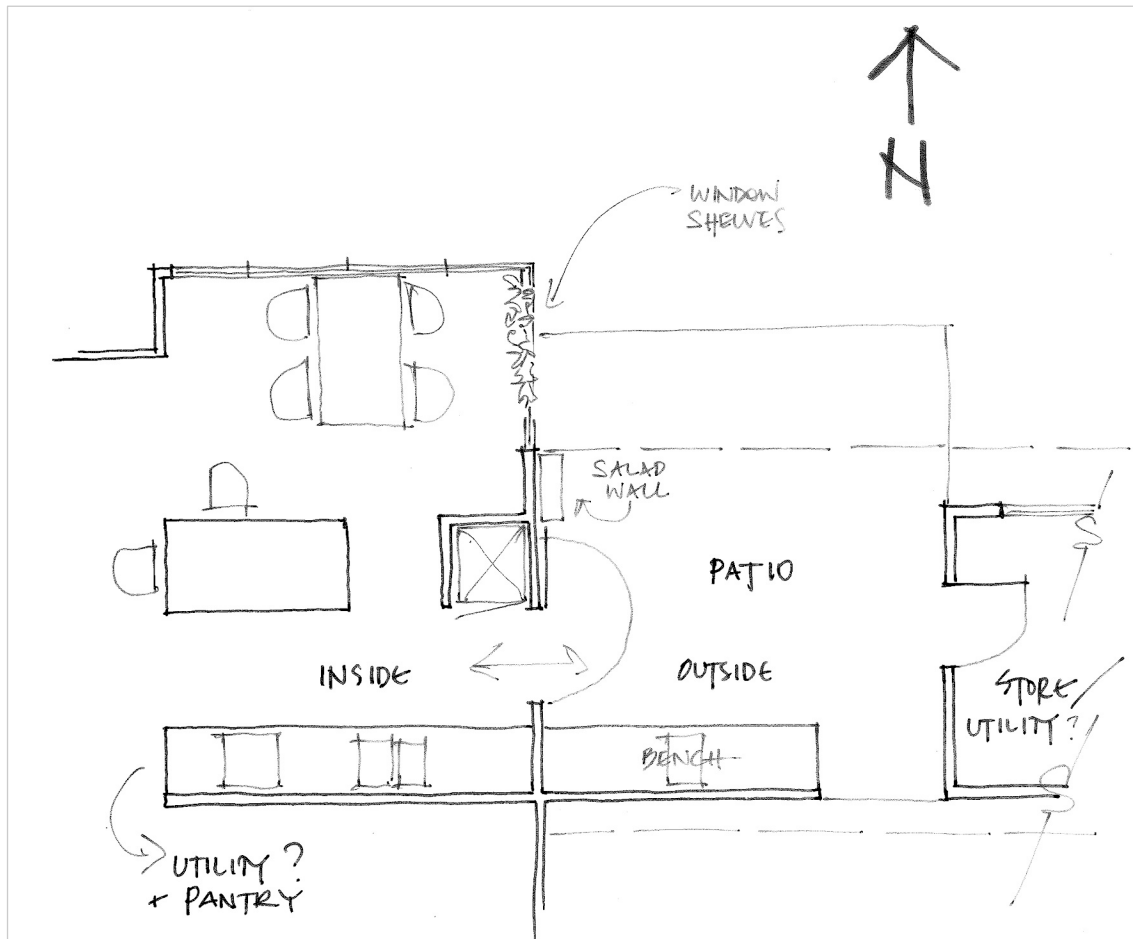


Figure 7.3: Indicative floor plan expanding the kitchen-garden interface for an affordable housing scenario

To demonstrate how this food axis pattern might begin to underpin spatial ordering, I have taken the hypothetical but relevant case of designing new, affordable and flexible housing, by applying the pattern to a slightly larger setting that would better meet family needs. Figure 7.3 features an indicative floor plan in which the food axis pattern has been adapted with an expanded kitchen-garden interface including an internal island bench and sunny window shelves within the eating area. This attempts to provide a modest and functional arrangement, sensitive to social interaction, with flexibility for family activities and projects afforded by the covered patio and adjacent store.

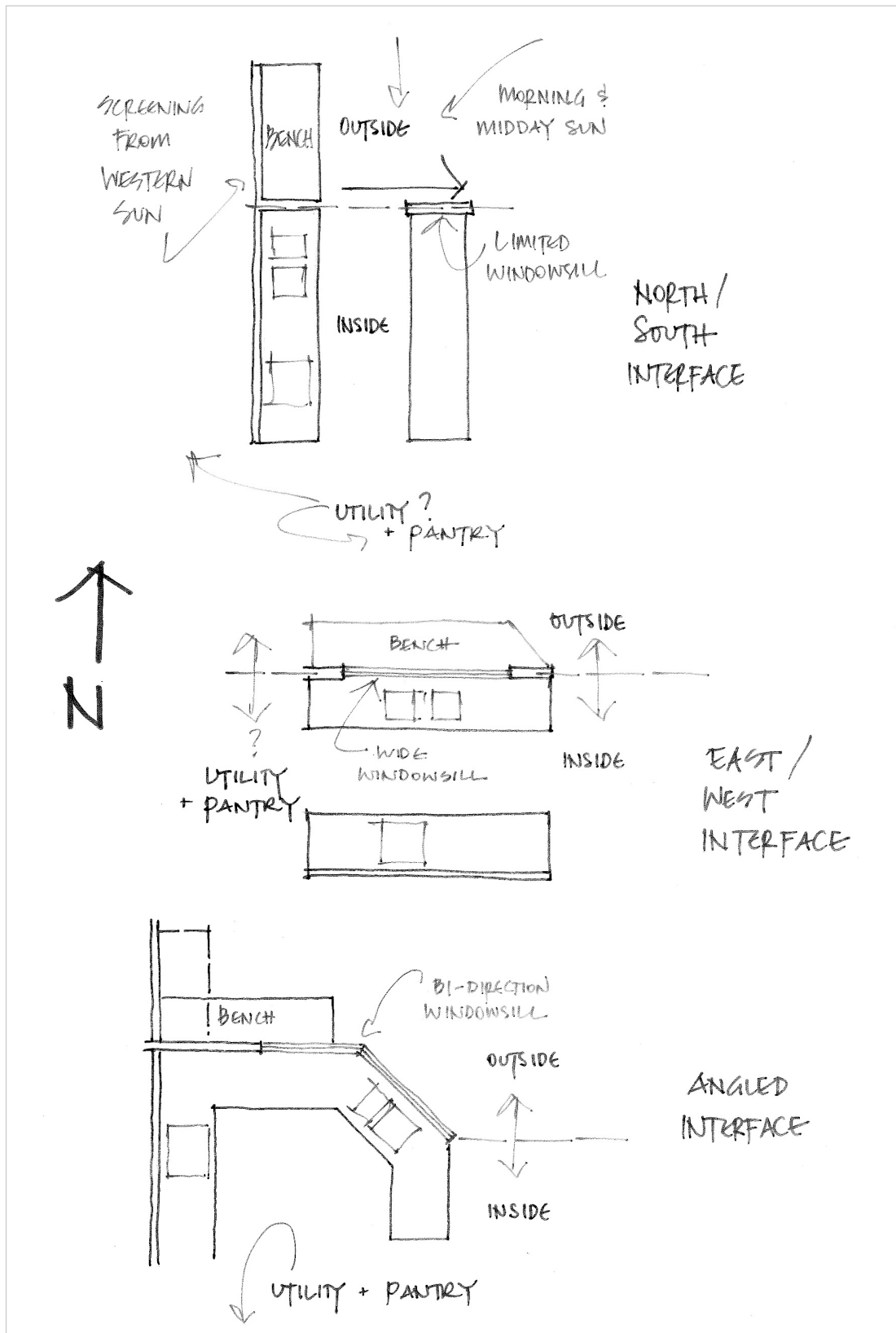


Figure 7.4: Exploration of alternative kitchen-garden interface orientations

I proceeded from these initial explorations by comparing my home's food axis pattern with the design meta-brief forming the conclusion of Chapter 6, for the purpose of critical reflection. As a result, I determined that kitchen form and orientation, and the resultant kitchen-garden interface begged further scrutiny and conjecture given how I anchored my indoor-outdoor kitchen upon an atypical, single wall spine. Focus upon this scale of the greater food axis is captured in Figure 7.4 in which I consider east-west, north-south and angled orientations and their respective merits in regard to sunny windowsills (facing north in the Southern Hemisphere), transition and social spaces, and positioning of pantries and utility rooms. Morning and midday sun is sought for optimal food growing and household comfort, while screening the kitchen, windowsill and workbench from the afternoon sun, all of which would be modulated according to location and climate.

In this design process, I have re-deployed the food axis concept as a design heuristic in which regenerative food system knowledge is embedded and applied to ecological design. As stated in the introduction to this chapter, my intention is not to define spatial-material archetypes, but to leverage my analysis of ecological food practices and homecraft to inform more considered spatial ordering in new and adapted housing. In the following section, I propose regenerative food axis patterns using the methods above for a range of housing density scales, corresponding to likely and potential food practices. These patterns offer heuristics with potential for further development, representation and application to ecological housing design.

### 7.3 Food axis patterns and ecological food practices

In proposing the following scalar regenerative food axis patterns, I do not naïvely assume that they would mesh easily with the current orthodoxies in housing design and construction. Rather, they seek to reflect and foster the practices of ascendant food movements, social enterprises and social relations. In turn, these social collectivities present fertile locations for developing, applying and evaluating this design knowledge via eventual working models. Such models would represent cultural artefacts with which to challenge the *status quo* and offer alternatives to existing housing typologies and green

counterpart 'solutions'. The food axis patterns are represented using the schematic wood block models with elaborative sketches that allow deeper spatial consideration of system flows and cycles interacting with the kitchen-garden interface. In conjunction with developing the sketches, I re-ordered the wood block components at times, re-working the sketches, in a critically reflective and therefore heuristic dialogue.

The likely and potential food practices prefacing each density scale below arise out of the empirically observed present but also anticipate a much wider consciousness shift. This is what 'urban homesteaders' Kelly Coyne and Erik Knutzen outlined in their hope for a new, interdependent urban agriculture *and* home economics they regard as necessary and urgent (2010, p. 320). A crucial shift in this scenario is that more householders become *engaged* in their food system and in shaping their spatial-material environments, through a variety of means including homecraft. The food practices are inclusive of related activities such as sourcing garden inputs, provisioning, and water and waste recycling to foreground the flows and cycles that would determine degrees of household regenerative capacity. I begin the design iterations at the high-density scale in recognition of the constraints to regenerative capacity posed by these settings, as established in the Phase 2 household ethnography. In this approach, each of the scales from high-density through to peri-urban serves as an iteration in itself for attempting to maximise regenerative capacity.

### High-density food axis pattern

The first food axis pattern works with the context of a small apartment with balcony and favourable orientation; a circumstance valid for only a proportion of existing apartments, regrettably. The pattern could be developed and applied however, to new high-density housing designed according to passive solar principles. Given my limited access to urban high-density settings in the participatory research phases, the speculation is enriched by the practical accounts of urban food production and practices of Coyne and Knutzen (2010), McLaughlin (2013), Mobbs (2012) and Naidoo (2011). I have also drawn upon my experience and observation of living in multi-dwelling, high-density housing developments in Stockholm, Brisbane, and Christchurch, and medium-density housing in York, England.

In Table 7.1, I propose the likely and potential food practices for the high-density scale:

Density scale	Likely and potential food practices
<b>High-density multi-dwelling developments, typically apartments</b>	<ul style="list-style-type: none"> <li>- Balcony and windowsill container growing</li> <li>- Rooftop communal growing</li> <li>- Product-specific methods such as potato sacks, mushroom kits and vertical garden solutions</li> <li>- Main crops include leafy greens, herbs, tomatoes, sprouts and citrus</li> <li>- Hydroponic and under-lighting growing systems</li> <li>- Small-scale kitchen composting (such as a Bokashi bin) and community composting</li> <li>- Community garden / street garden / urban farm participation</li> <li>- Sourcing of bagged garden inputs</li> <li>- Provisioning from farmers' markets and box schemes</li> <li>- Purchasing bulk staples, shared between neighbours</li> <li>- Frequent eating out and cooking at home</li> <li>- Small-scale preserving (such as bottling and freezing)</li> <li>- Trading produce with neighbours</li> </ul>

Table 7.1: Likely and potential food practices for high-density settings

The corresponding food axis pattern represented in Figure 7.5 is compact by necessity and seeks to balance the inclusion of food axis components that would facilitate the practices above with valuable multi-use living and social space.





Figure 7.5: High-density food axis pattern in schematic representation

In attempting to spatialise the food pattern through the sketch in Figure 7.6, it becomes apparent that while productive and social space can be combined effectively in a small area, there are severe limits to the nutrient and water cycling possible at this scale given the high reliance on garden inputs and the practical challenge of composting organic matter. The nutrient flows are represented on the sketch by green arrows, with water in blue, and material flows in purple, as for all subsequent sketches.



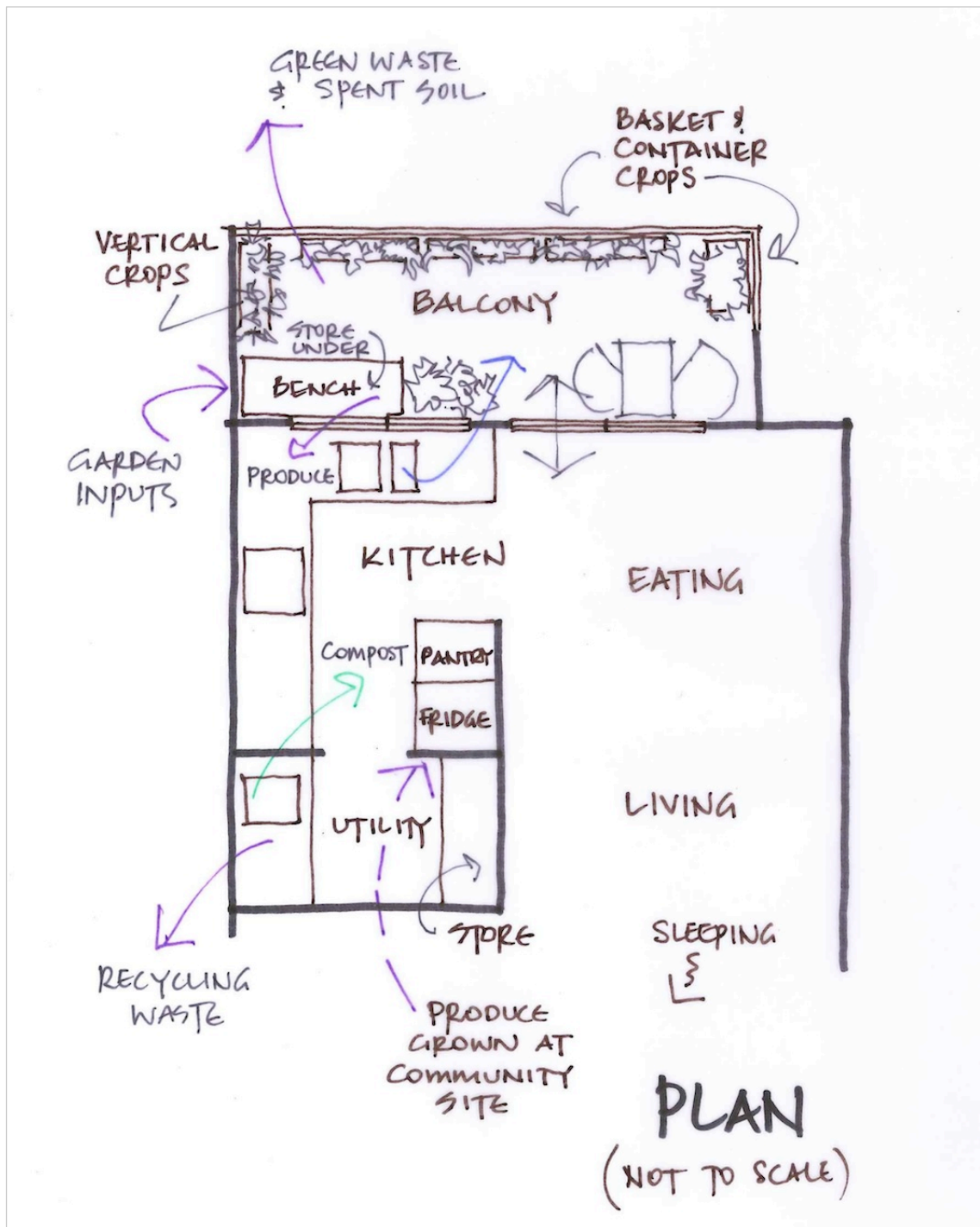


Figure 7.6: High-density food axis pattern applied in an indicative spatial layout

The linked kitchen and utility room in Figure 7.6 lends flexibility for small-scale composting and preserving, manual grey water cycling and waste sorting for recycling. In support, highly serviceable flooring throughout would be crucial given that garden inputs and green waste must be carried through the apartment. The identified practices signal that the regenerative potential of this high-density scale would depend upon interchanges with community-scale

facilities such as community compost and urban farms for wider provisioning, sourcing garden inputs and perhaps up-skilling. Further to this dependency, designing in and normalising on-site composting and potting soil making facilities in future housing developments, along with more ambitious water conservation, energy and waste cycling approaches, are clear priorities. Management of such facilities however, will continue to present barriers until body corporate structures evolve in step with urban agriculture and householder lobbying.

### Medium-density food axis pattern

This medium-density pattern assumes a narrow plan and small courtyard with a possible second level, typical of townhouses or row housing. The likely and potential food practices are outlined in Table 7.2:

Density scale	Likely and potential food practices
<b>Medium-density multi-dwelling developments, typically townhouses, villas and small detached units plus urban infill housing</b>	<ul style="list-style-type: none"> <li>- Mixed growing methods, including raised beds, vertical growing and containers</li> <li>- Windowsill seed-raising, sprouting and small-scale seed-saving</li> <li>- Mixed crops, including vegetables and fruit plus native habitat</li> <li>- Kitchen and garden compost, plus wormfarm</li> <li>- Recycling of grey water; small-scale water collection</li> <li>- Sourcing of bagged and bulk garden inputs</li> <li>- Mixed provisioning including farmers' markets and bulk whole food outlets</li> <li>- Community garden / school garden participation</li> <li>- Eating out and social cooking at home</li> <li>- Preserving (such as bottling, freezing, drying and fermenting)</li> </ul>

Table 7.2: Likely and potential food practices for medium-density settings

Arising from these practices and greater productive space, including valuable vertical space, the food axis components are expanded, as shown in Figure 7.7,

gaining rotation beds, staged composting, a wormfarm, small-scale water harvesting and a bi-directional sunny windowsill. The latter provides easily observed and tended growing space inside and outside. Again, combining social and productive space is a priority, with the workbench serving multiple potential uses, providing under bench storage and an awning roof collecting water for garden use. Outdoor seating could also double as storage boxes for garden tools, pots and bagged inputs.



Figure 7.7: Medium-density food axis pattern in schematic representation

In spatialising this pattern via Figure 7.8, I propose a linked kitchen and utility for maximum flexibility, utilising space deeper in the layout for potential preserving equipment and storage of preserved and bulk foods, as well as waste sorting and small-scale compost. The linked kitchen and utility room also widen options for the observance of religious or cultural food practices as with kosher kitchens. High-level glazing panels could introduce borrowed light to such a space from the kitchen, with a sliding door to buffer the noise of the washing machine. While the overall system is still firmly dependent upon garden inputs, the combination of wormfarm, staged compost and rotation

improves nutrient and organic matter cycling significantly compared with the high-density example. Fences and boundaries also invite the planting of natives and beneficial plant species for attracting wildlife and pollinators.

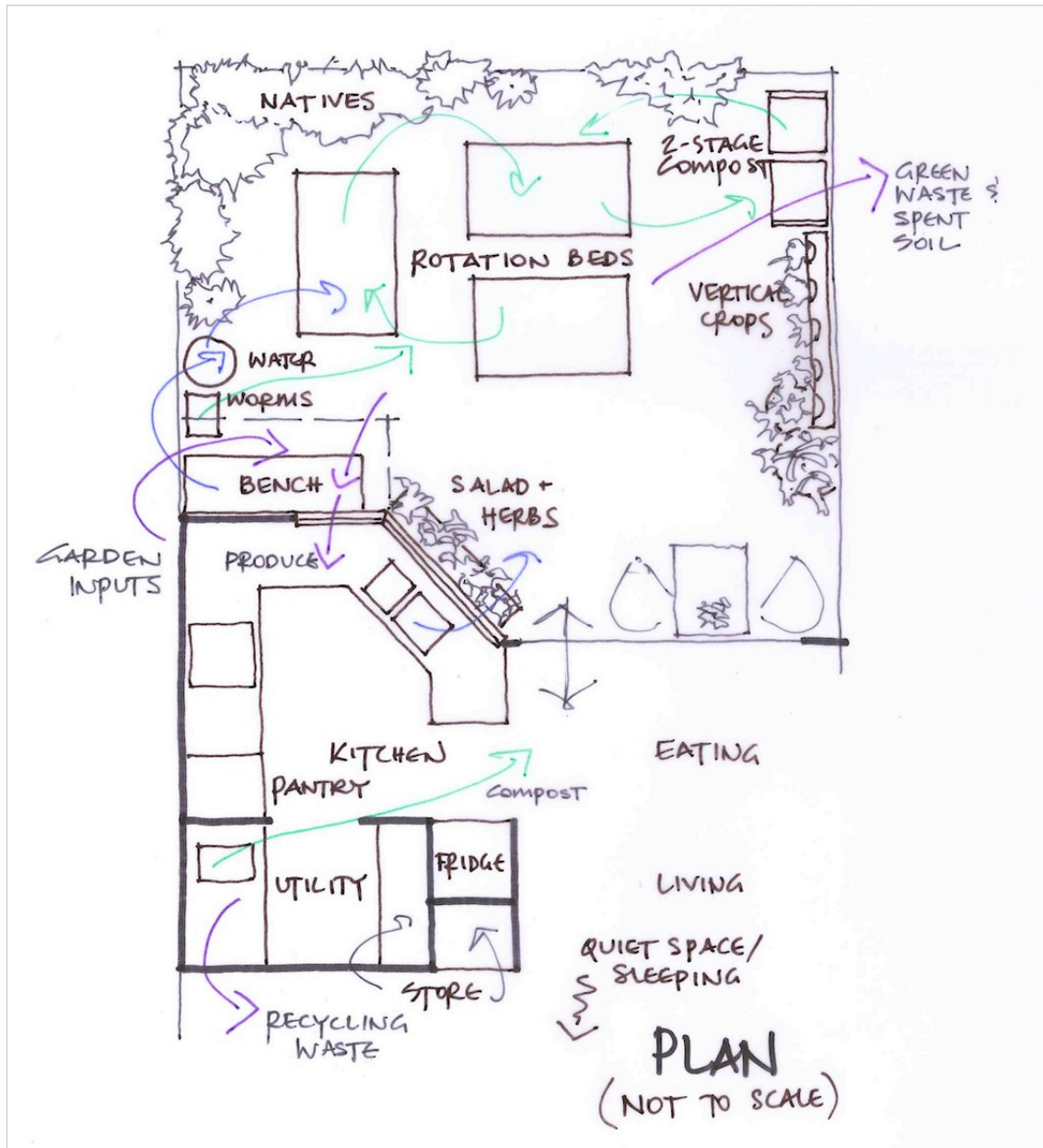


Figure 7.8: Medium-density food axis pattern applied in an indicative spatial layout

I continue to indicate rotation beds as the primary growing method in the subsequent schematic patterns for ease of representation. However, mixed beds, in-ground cultivation, terraced beds, keyhole gardens and food forests are all alternative approaches, subject to tenure, topography and one's gardening philosophy. Raised, rotation beds however, can be designed for

potential disassembly and erected irrespective of the sub-soil condition, rotation being a proven strategy for maintaining soil health and averting plant disease. A limited ability to rotate can also be mitigated with crops that serve as soil tonics such as the biofumigant, *Brassica juncea*.

## Urban and suburban food axis patterns

At the urban and suburban scales, I have approached the patterns with both adaptation and smaller lots for new housing in mind. The likely and potential practices listed in Table 7.3 would be similar in each case, I suggest, with the inclusion of chickens and bees being the most obvious variables.

Density scale	Likely and potential food practices
<b>Existing inner urban and new detached suburban housing on smaller plots</b>	<ul style="list-style-type: none"> <li>- Mixed growing methods, including rotation beds and zoning</li> <li>- Vegetable and fruit crops, green manures, biodiversity and habitat</li> <li>- Windowsill and greenhouse / cold frame seed-raising; seed-saving drying and storing</li> <li>- Kitchen and staged garden compost, plus wormfarm</li> <li>- Water harvesting and grey water recycling</li> <li>- Chickens, bees and wildlife habitat</li> <li>- Sourcing of bagged and bulk garden inputs</li> <li>- Mixed provisioning including bulk whole foods and farmers' market / community garden supplementation</li> <li>- Eating out, social cooking and preserving</li> <li>- Mixed preserving methods with differentiated pantry and larder storage</li> </ul>

Table 7.3: Likely and potential food practices for urban and suburban settings

The first urban pattern responds to an ordering of space common to mid to late twentieth century Australian housing in which a laundry or utility room separates the kitchen from the rear yard. These spaces may have been additions accompanying the arrival of reticulated services, and then incorporated as standard into later house plans. The further addition of a covered patio has



been a typical, contemporary means of creating social space in the rear yard. The pattern in Figure 7.9 seeks to optimise this kind of existing layout without structural changes, utilising the cooler southern side of the house for a larger and preserving equipment.

Figure 7.9 Existing urban food axis pattern in schematic representation



Figure 7.10: Re-ordered food axis pattern for new suburban settings, in schematic representation

The pattern is spatialised in Figure 7.11 with an expanded kitchen-garden interface reviving the 'dirty kitchen', 'wet room' or 'mud room' adjacent to the kitchen, in addition to access between indoor and outdoor eating and social space.

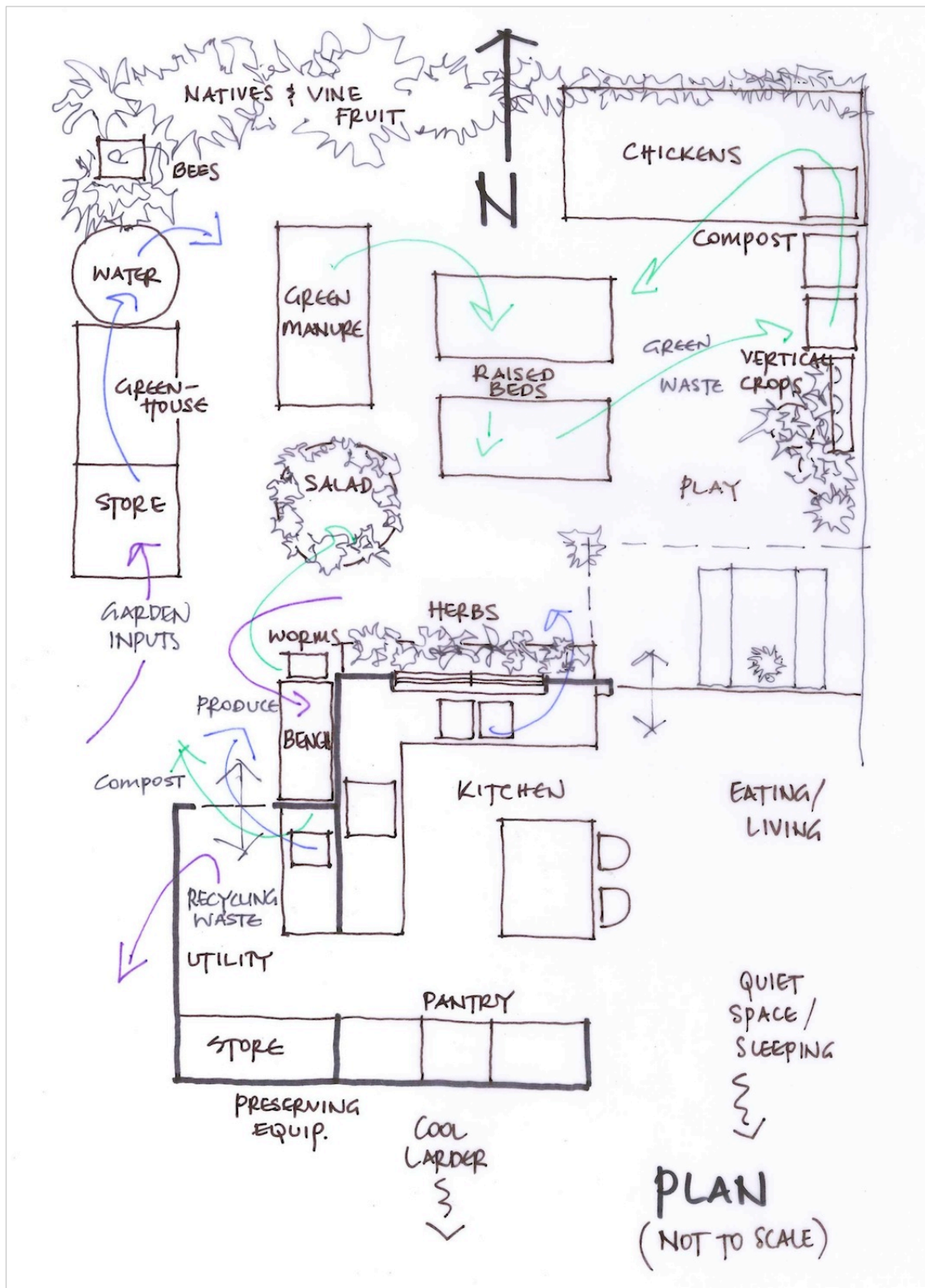


Figure 7.11: New suburban food axis pattern applied in an indicative spatial layout

The larger yard area prompts greater consideration of zoning with frequently harvested crops and the wormfarm close to the utility room. A greenhouse or shade house structure serves dually for water collection. The addition of chickens to the system provides both eggs and enhanced nutrient cycling in



conjunction with the three-stage compost, along with clean-up services in the rotation beds. Bulk garden inputs, while still required, can cycle more effectively with manured straw from the chicken coop and green manures, expanding composting options and volumes. Vertical space is utilised for native habitat plants and vine fruits in which honey or native bees could also be accommodated. Providing habitat for bees is crucial given the advent of Colony Collapse Disorder in Europe and North America, and the appearance of new bee diseases in Australia. In the use of yard space, productive space has been prioritised over play space, mindful of the likelihood of front yard, street and community play spaces, and the pressing need to reclaim suburban streets as shared zones from their domination by cars.

### Peri-urban food axis pattern

With the shift in scale comes a deviation in what I propose might comprise a food axis pattern for some peri-urban settings. It seeks to activate an immense existing resource in the form of park-like, residential acreage properties located on the fringes of major cities. Prior to subdivision, such land was often arable and supported market gardens supplying the proximal suburbs and city. My proposal draws upon the many landshare schemes common in the United Kingdom and responds to the limitations in regenerative capacity I identified in the high-density pattern (Figure 7.5) and medium-density pattern (Figure 7.7). It presumes that a minority of peri-urban landowners might entertain alternative social relations on ideological grounds, somewhat at odds with current conventions of public-private space and access. The food axis components are both infrastructural and temporal, and the pattern relies to a great extent on the design of dematerialised networks, coordination systems and events. Outlined in Table 7.4 are the likely and potential practices for this landshare inspired speculation:

Density scale	Likely and potential food practices
<b>Existing rural-residential and small acreages on the fringes of cities</b>	<ul style="list-style-type: none"> <li>- Extensive vegetable, fruit, green manure, mulch and fodder crops</li> <li>- Small-scale livestock rearing for household consumption and barter</li> <li>- Chickens, bees and wildlife habitat</li> <li>- Net supplier of animal and green manure to urban growers</li> <li>- Landshare orchards and cropping for tubers, root crops, onions and garlic tended by small co-operatives of urban dwellers</li> <li>- Cooperative large-scale harvest and preserving events</li> <li>- Small-scale tree plantations for coppicing, charcoal production, and timber for fencing and homecrafts</li> </ul>

Table 7.4: Likely and potential food practices for peri-urban, landshare settings

In spatialising these practices in Figure 7.12, what is often expansive lawn flanking a dwelling has been transformed into large rotation beds, orchard and beneficial planting with an emphasis on food crops that require more space than is available in urban settings. The layout and native plant screening seek to maintain visual privacy for the house and demarcate a gentle boundary for landshare visitors. Modest facilities in the form of a water source, composting toilet and shelter are provided, with the latter suited to staging temporary harvest events such as group pickling, bottling and juice pressing.

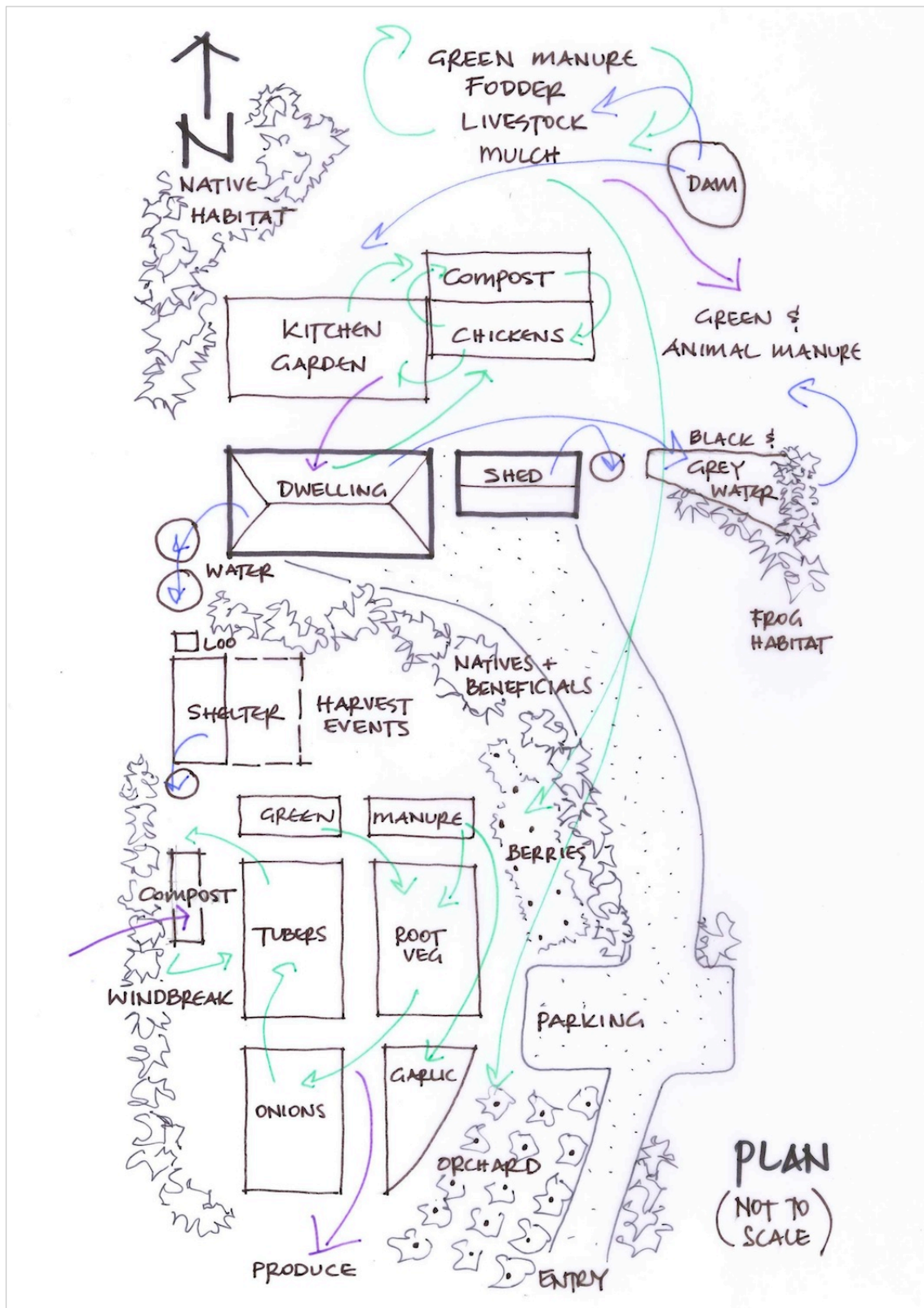


Figure 7.12: Peri-urban food axis pattern applied in an indicative spatial layout

As the practices suggest, this model is utterly contingent upon landowners' willingness to enter into an agreement with a small cooperative of urban dwellers and the summoning of funds for start-up costs. Procedures and

responsibilities for ongoing operation would need to be devised, including organising and funding harvest events, along with protocols for handling disputes. These considerations are an application of the guidance April Philips (2013) sets out for designing and setting up community gardens, highlighting that existing landshare schemes may be positioned to share operating models and resources that could be adapted.

## Summary of the regenerative food axis patterns

In summarising the regenerative food axis patterns above I must acknowledge their inherent limitations. First, I have limited the indicative spatial plans to dwellings with rear yards, mindful that much existing (and new) housing is poorly sited with regard to sun access, and designed for maximum investment return. Side yards and front yards can of course be transformed into productive space with transitions forged between indoors and outdoors, but it is more difficult to achieve the synergies between food axis components that I have proposed. Rear yards on the whole afford the most flexible combinations of productive, functional and social space, vertical space, privacy and greater options for a facilitative kitchen-garden interface. Second, in these speculations I have not sought to resolve important spatial and material detailing in the absence of defined contexts and occupants. Rather, I offer a brief discussion in this summary of spatial and material implications that could inform design resolution within specific contexts and projects.

Through this process I have endeavoured to facilitate household regenerative capacity integral to anticipated functional, social and affective needs while balancing ecological design considerations. Despite the higher densities posing restrictions on regenerative capacity unless coupled with community facilities, there may be mitigating ecological pluses in these settings. These include improved thermal mass in multi-dwelling buildings over detached housing types, greater energy efficiency per dwelling, economies of scale in renewable energy sources such as solar and wind, and wider householder uptake of public transport, cycling and walking in denser urban areas. This point highlights that regenerative capacity needs to be considered beyond the dwelling and its localised food system.

The kitchen-garden interfaces proposed from the food axis patterns above represent spatial re-evaluations that seek to re-order and reduce dwelling space rather than demand more space and resources. In the interests of designing more modest floor areas for the Australian context, housing design would benefit from a broader re-appraisal of space based upon five key observations. First, the trajectory of technological design is resulting in increasingly miniaturised, personal and mobile devices that, along with flat-screens for viewing media, could be grounds for shrinking lounge space in favour of combined food and social space. Personal devices are much more likely to 'follow' the user and become integral to social encounters and tasks at hand, even at the kitchen table. Spatial allocations still often display the legacy of a large television 'shrine' and a wall dedicated to fixed technologies. Second, passageways could be designed with nooks for docking mobile devices and quiet, breakout spaces to compensate for smaller lounges, in which vertical space too is better utilised for storage.

The third observation targets storage, with space deep in the dwelling plan suited to central, multi-purpose storage. This could enable slightly smaller bedroom areas and less room-specific storage that is less likely to be shared and perhaps more likely to be filled (in the manner of capacious fridges and freezers). Fourth, the current primacy of luxurious, water and space hungry 'wet rooms' could be challenged by providing functional utility rooms and more modest, but accessible bathrooms. Finally, smaller and electric cars and electric bicycles could be relegated to simpler, water-harvesting shelters (in spite of the insurance incentives for garaging), replacing vast garages with smaller multi-use, lockable making spaces that dually support the food axis.

This exploration of the kitchen-garden interface, its zones and sequences, and the interplay of indoor and outdoor kitchen components also begs material re-evaluation. By subscribing to a workshop logic for these spaces, I suggest unapologetically that their materiality should serve this end over concerns for aesthetic unity and the display of social capital. This would require a shift in aesthetic sensibilities but it is incumbent upon ecological design practitioners, I suggest, to usher in this cultural shift. The move toward a more disaggregated

food axis in the patterns proposed, coupled with cradle-to-cradle thinking, also begin to guide materiality in several ways.

The benches featured as integral to indoor-outdoor transition and utility spaces, for example, could utilise salvaged stainless steel sinks and reclaimed timber for framing, with functionality further enhanced by overlaying chopping blocks and hinged worktops. Transition, utility and indoor kitchen spaces could all potentially re-use components of commercial kitchens, which are subject to frequent turnover. Stainless steel worktops and shelf units are highly durable and their initial high embodied energy would be offset by ongoing use. The consideration of zones for washing and preparing produce, group preparation tasks, cooking, serving and clean-up suggest differentiated worktops such as stainless steel for wet and cooking areas and timber or stone for island or layover spaces (for example, see Figure 7.15). While more expensive upfront than laminated board products, their durability and material integrity better support a cradle-to-cradle goal and contain lower levels of off-gassing VOCs.



Figure 7.13: The kitchen in my home under construction using surplus hardwood and plywood boxes that could be re-purposed

The inclusion of robust transition spaces and utility rooms may also allow for re-thinking the indoor kitchen components. In the example of my minimal indoor kitchen (Figure 7.13), low VOC plywood ‘boxes’ support a worktop crafted from surplus roof framing timber. If required, the majority of boxes and shelves can be separated and re-purposed as future storage units elsewhere. This was a deliberate attempt to merge a considered design using modest and renewable materials, and minimal adhesives and composites, with the transformative mastery of a craftsperson. In terms of assigning value, I prioritised the craftsperson’s skills and the integrity of the ecological design principles to which I had committed. The later positioning of a kitchen/dining table opposite provides layover space during cooking, allowing the kitchen to function more like a galley layout.

In the penultimate section of the chapter to follow, I shift focus from my speculations upon future housing to the great latent potential bound within our existing housing stock. Through this second discussion I also shift from questioning housing types, to focus on the role of designers and design practice through a social-ecological lens in an effort to elucidate the practice of design for resilience.

## 7.4 ‘Adaptive re-use of the suburbs’, home by home

In phrasing their vision for integrating housing and food systems as the ‘adaptive re-use of the suburbs’, Brandt and Lonsway (2012) captured poignantly the profound and latent potential of the suburbs and their existing infrastructure. Despite increasing urban densification, vast suburban tracts of Australia’s major cities occupy potentially regenerative land in climate zones suited to food production for the majority of the year, or year-round assuming climate-sensitive, seasonal approaches. This is unsurprising given that much urban and peri-urban housing sits upon what was once cultivated, productive land. Recognising and designing for this potential is a progression of the resource (and cost) awareness that now sees patchworks of suburban roofs utilised for solar collectors and rainwater harvesting.

In this section, I profile the example of Suburban 5 from the Phase 2 household ethnography as an instructive adaptive case. I also propose strategies for building the adaptive capacity of suburban communities by applying resilience thinking to ecological housing design. As I underscored in Chapter 1, the collective homescape represents the greatest potential site for the immediate exercise of ecological agency by individual householders and social collectivities.

While unanticipated in the household ethnography, I observed in the majority of settings significant adaptations that householders had wrought upon their domestic environments in pursuit of living more sustainably. Even if householders were improvising their food producing practices, as were the renters in particular, the visual evidence of their adaptations was undeniable. Further scope for adaptation was also demonstrated by the wider set of design speculations illustrated in Chapter 6. Suburban 5, a renovated older weatherboard house located in an inner Hobart suburb, exhibited the most compelling suite of adaptations resulting in a regenerative food axis supporting year-round food production and partial self-sufficiency. The site, once consisting of lawn and rose bushes, is now planted intensively with native plant species and food crops, utilising the existing hard landscaping. Chickens also provide eggs and important nutrient cycling. Through mapping the current food axis on an approximate site and house plan in Figure 7.14, it is possible to identify the adaptations made and the householder's systems approach.



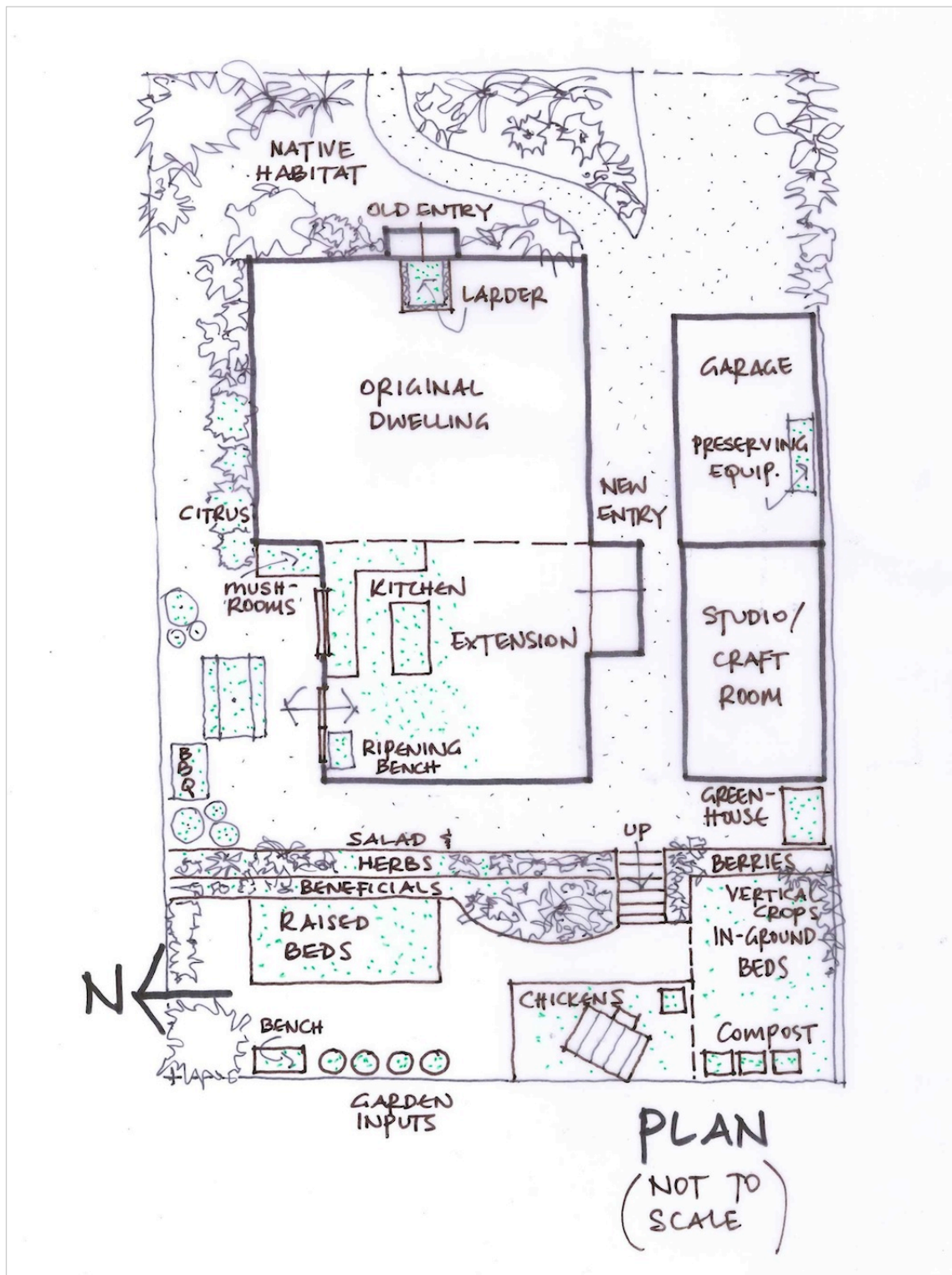


Figure 7.14: A mapping of the Suburban 5 food axis showing the extent of adaptations

Lamenting the omission of water harvesting and recycling, the householder concluded that the space required for a water tank would be at the expense of food crops. The native plant species, at least, require no watering except in extreme conditions. In conjunction with the rear extension, the house has acquired solar panels and solar hot water along with insulation, and now

features a workshop kitchen crafted largely of reclaimed materials and re-used joinery (Figure 7.15). During the harvest season in early autumn, the kitchen is extended temporarily into the adjoining space with extra tables for ripening and bottling. Over nine years, refinements have been made to the garden systems and the internal food-related facilities, in line with the development of the householder's practices.



Figure 7.15: The workshop kitchen of Suburban 5 constructed from salvaged materials and re-purposed joinery

**The role of networks and collaborations in adapting the everyday**  
Given the unanticipated adaptation activity observed in the 12 study settings and exemplified by Suburban 5, I was motivated to probe the social dynamics from which they arose. Householders in the study had self-identified as being committed to living more sustainably, and were of course recruited via relevant networks. Our subsequent conversations revealed that many others had been involved in the transformation of these homes and gardens to serve everyday practices. Across the 12 settings those enlisted included joiners, metalsmiths, artists, horticulturalists, permaculture designers, furniture makers, landscapers,

teachers, mentors and peers. This involvement evokes the 'interdisciplinary nature of the everyday' that Sarah Wigglesworth and Jeremy Till (1998) observed in relation to architectural production and the everyday. Householders emerged as initiators who had tapped into informal and formal community networks in order to garner the knowledge and skills needed for enabling their food producing and broader sustainable living practices. Reflecting upon these collaborations that sit *outside* professional designer-client relations, I questioned how ecological design practice might locate itself within such grassroots sites to help activate the adaptive re-use of the suburbs.

### How can ecological design practitioners activate adaptive re-use?

I propose here two potential engagement strategies for ecological design practitioners drawing upon the lifelong learning pedagogies for sustainable living explored by John Blewitt (2006), and the resilience framework of the Stockholm Resilience Centre (Moberg & Hauge Simonsen, 2011; Hauge Simonsen *et al.*, 2014). In these strategies, design practice is characterised less by directing the production of more 'stuff', and rather by fostering what Till and Schneider (2012) term 'invisible agency'. The first strategy involves authentic models using existing suburban housing and streets as exemplars, while the second applies the resilience notion of a 'shadow network' to adaptive re-use. Arising from this discussion, I close the section by noting the limitations of professional design knowledge, and the complementary know-how offered by grassroots networks that bridge craft, everyday and professional design practices.

Utilising existing housing adaptations as localised models is becoming a key catalyst in mobilising clusters of neighbours, streets and communities to gain greater ecological literacy and adaptive capacity. The example of Michael Mobbs' adapted terrace house in Myrtle Street, Chippendale, Sydney is laudable. Over a decade since his own home adaptations featured in *Sustainable House* (1998), Mobbs has facilitated a range of sustainable street and community strategies centred on urban food and green space regeneration, with local authority support (Mobbs, 2012). Myrtle Street is now a magnet for visitors who attend house tours, and 'edible street' and urban farm tours. Granted that not all neighbours would welcome such notoriety, the ability for

people to engage with such 'living labs' is compelling, to again borrow the concept from participatory design (Björgvinsson, Ehn & Hillgren, 2012). Social media play a vital role too in promoting the house, the tours and connecting people with them and related activities such as farmers' markets and CSA schemes.

Emphasising the role of the experiential in *Ecologies of Learning*, Blewitt (2006) discusses the potential for people to learn from models that connect with everyday practices. While there exist overt ecological learning models such as the Swedish 'Circle of Life House' (*Kretsloppshuset*) profiled in Section 2.4, and the Eden Project in Cornwall, England (discussed by Blewitt, 2006, pp. 61-83), suburban housing and streets already adapted according to ecological design principles can be harnessed readily as authentic models. In practice, this would be subject to the brokering of consensual community agreements, as Mobbs has done over time.

The example of the CERES Environment Park in Melbourne combines community gardens with allotment gardens, a produce market, renewable technology models and a food growing skills program. Such settings are crucial in the view of resilience scholars Barthel, Parker and Ernstson (2013), for rebuilding and maintaining the 'social memory' of urban food production. In Tasmania, the not-for-profit organisation Sustainable Living Tasmania organises tours of ecologically designed homes, and out of such activity a role for designers emerges, assisting householders to reflect upon and contextualise what they have experienced in relation to their own domestic environments. Transferring this experience into action might then involve a designer in wrangling the requisite knowledge and skills with an emphasis on re-materialising and upcycling practices. The second strategy offering potential value to ecological design practice is the example of shadow networks. In resilience parlance these are purposively assembled collectives of diverse knowledge and skills applied to the governance of social-ecological systems (Moberg & Hauge Simonsen, 2011). Unlike typical teams of professional consultants, shadow networks are consciously inclusive of marginalised indigenous and localised perspectives and approach problem framing at a range of spatial and temporal scales. This kind of engagement parallels Awan,

Schneider and Till's inclusion of social networks as sites of spatial agency, in which designers and other parties work together, on equal terms, as 'expert citizens and citizen experts' (2011, p.32).

Taking the example of Suburban 5 once more, and the design speculations proposed by the householder in Chapter 6 (see Figure 6.27), in which immediate neighbours' boundaries became permeable and food production more interdependent, the potential for a small-scale shadow network becomes apparent. The knowledge and skills of respective householders are brought to bear upon the shared goals and practices, and ongoing collaborations become essential to the regenerative systems that householders establish. Again, it could well be grassroots-embedded designers, or community-based consultants like Mobbs, who facilitate and support representation of the ideas of the neighbours committed to collaborating. Leveraging other localised, authentic models in the process would be an obvious complement to such network development.

In these two strategies, design practice is embedded within the intersecting grassroots movements in which householders, craftspeople and urban food advocates, for example, are also active. This creates a shared ideological basis for engagement, and recognises that social-ecological systems hinge upon a diversity of knowledge and manual making skills. This contrasts sharply with highly specialised professional design practice which typically organises itself around spatial types, such as commercial design, healthcare design or residential design. In contrast, an embedded form of practice is contingent upon designers co-engaging in the practices of householders who are enacting sustainable living agendas such that designers too develop a *lived* ecological literacy. As I have argued in relation to the roles of craft and design in sustainable living, a lived ecological literacy goes well beyond that codified in professional regulations, standards and rating schemes, which while important, are nonetheless partial (Fountain, 2014). In short, design for adaptive re-use needs to celebrate the domestic realm and get its hands dirty if resilience is to be bolstered beyond limited suburban pockets.

## 7.5 Conclusion

This chapter, as research *through* design, results from inquiry conducted as the 'integrative meta-practice' Fry (2009) assigned to design. I have drawn together the outcomes of the preceding research phases – research *into*, and *for* design – to inform and guide the generative and iterative processes represented throughout the chapter. In responding more comprehensively to the third research question, I have detailed how design research can propose regenerative kitchen-garden systems as a contribution to urban resilience through synergistic spatial-material, adaptive and dematerialised design strategies. Reflecting on the outcomes of the Phase 2 household ethnography and Phase 3 participatory design workshops, I first positioned home-based food production within a wider set of homecraft and making practices. Parallel to the design process I came to recognise these practices as crucial threads in reviving know-how, self-efficacy, and household and community resilience, also offering people a means with which to disengage from mainstream production and consumption.

Merging exploration of the spatial implications of home-based making practices with the design meta-brief concluding Chapter 6, I approached development of the regenerative food axis patterns via an enriched theoretical framework. The subsequent food axis patterns proposed for high-density, medium-density, urban/suburban, and peri-urban housing settings arose in dialogue with the likely ecological food practices I articulated for each scale. I also worked with scale as a tool for maximising regenerative capacity, expanding the range and dynamics of food axis components with increasing scale. The process of spatialising the food axis patterns centred on the kitchen-garden interface as the *system catalyst*, and underscored that nearly all home-based food systems are in fact dependent sub-systems. I demonstrated that household regenerative capacity is a function of interdependencies with larger scale systems, namely community and regional sources of nutrient and organic matter inputs and the ability to nullify waste. This characteristic of all social-ecological systems highlights that the inherent complexity cannot be resolved solely through spatial-material means. My re-evaluation of domestic spatial ordering and

materiality has, however, suggested how the regenerative food axis patterns might be accommodated and applied in specific contexts.

In addressing *how* design research can support urban resilience, I also proposed strategies for activating the adaptive re-use of the suburbs, revisiting Suburban 5 to demonstrate the adaptive potential. The strategies I ventured for design practice effectively hybridise design thinking and resilience thinking, based on leveraging living labs as authentic models of suburban adaptation, and facilitating the formation of small-scale shadow networks. These design strategies situate ecological design practice within localised and grassroots networks of diverse skills and know-how, complementing professional expertise with a lived ecological literacy. The transfer, evaluation and application of this new design knowledge, I suggest, hinges upon bridging design research for resilience with the discourses of practice. To this end, I conclude Phase 3 by distilling a practice-focused design framework for integrating housing with regenerative food systems in the final chapter to follow.





## Conclusion

### 8.0 Key outcomes and arguments

In this study I have ventured a practice-focused response to the overarching question posed in Chapter 1: how to nourish and shelter a burgeoning global population in conditions of escalating ecological overshoot. My processes of research *into*, *for* and *through* design have foregrounded a paradox with respect to the intentionality of design. The dominant, contemporary institutions that supply our food and housing – the global, industrial food system and the housing industry and its types – are perpetuating ecologically degrading cultural practices. At the same time, existing homescapes and the vast tracts of land they occupy, are being adapted in diverse settings to re-localise food systems, restore urban ecosystems and build resilience. In proposing ways for ecological design to advance the latter, I am indebted to the participants whose generous contributions made the study possible. In this final chapter, I recapitulate the key outcomes and arguments in relation to each of the three, key research questions, followed by reflections on the methodology and design research for resilience. In Section 8.1, a framework of design strategies follows demonstrating *how* urban resilience can be enhanced through design, in a further response to the third research question. The framework also provides a summary, and the first step toward transferring this new design knowledge to practice. I then identify limitations of the study in Section 8.2, and conclude the thesis with opportunities for future inquiry in Section 8.3.

**Research question 1: What are the significant connections between food and housing, relative to changing social and ecological conditions over time?**

In the first phase of the research design, I made several connections between food and housing relative to changing social and ecological conditions. Having established the global ecological status in Chapter 1, I drew out parallels between the industrial food system and mainstream housing provision in the literature review of Chapter 2. The supply of food and housing was characterised as being predominantly market- rather than needs-driven with the practice of design (stretching to food technology) implicated in spurring new food, housing and kitchen commodities according to the logic of capital.

In Chapter 3, I examined the hybridity of design knowledge – exemplified by my bridging of housing, food systems, and ecological design – and identified distributed sites for social-ecological knowledge-making. In positioning design in the service of a resilience agenda, I set out how research *into*, *for* and *through* design could first connect food and housing from a social-ecological systems perspective, and subsequently venture alternatives to the *status quo*. My account of conducting ‘design research for resilience’ in Chapter 4 interrelated resilience inquiry, practice theories, questions of type and participatory design, the first three of which were harnessed in the social-ecological analysis of Chapter 5. In this, I illuminated how ‘foodie’ culture promotes ‘the art of lifestyle’, and perpetual renewal of the home, the kitchen and the self. In tandem, I revealed that much greening targeting the home is little more than what Cook and Swyngedouw (2012) termed ‘ecological modernisation’. On the flipside of this conclusion, I merged ecological design with material agency concepts to recast the home and kitchen as ‘ecological agents’, facilitating and validating ecologically literate household practices.

The food axis of Collins Cromley (2010) proved to be a compelling vehicle for following John Ruskin’s path as one who “refuses the present, [and] looks backward in order to look forward”, as Sennett captured (2008, p. 114). The pre-industrial food axes I explored along the temporal trajectories of food and

housing offered insights that manifested in the design iterations of Phase 3. This historical exploration centred on the tightly woven interplays between subsistence imperatives, geography, foodways and food spaces that I suggested take on renewed relevance for building resilience. Crucially, the food axis also enabled a spatial conception of food provisioning attenuating far beyond the material kitchen, in an inter-scalar manner compatible with social-ecological systems thinking.

**Research question 2: How do the practices of ecologically literate, home-based food production fit with dominant housing typologies, and particularly their kitchens and gardens?**

In representing the outcomes of the multi-household ethnography in Chapter 6, I demonstrated that the fit between ecologically literate food-producing practices and dominant housing typologies is a function of multiple factors. I explained the fit as impacted by housing type, scale and tenure, and co-determined less directly by householders' approaches to producing food, social relations at home, and whether the home served as a 'workshop'. Further determining the fit between practices and housing types was the divergence between householders' goals of food source supplementation or quests for self-sufficiency. I linked greater household regenerative capacity with increased scale, identifying the systems and cycles contributing to this capacity and therefore resilience, noting in particular the cases of Suburban 1 and 5 (see Sections 6.2 and 6.3). Medium-density housing emerged as a scale at which regenerative capacity could be considerably increased compared with high-density, and overall capacity enhanced by complementary urban systems and infrastructure including community scale food hubs.

Two unanticipated and synergistic themes emerged during Phase 2 of the study, as developed through the discussions of Chapter 7: food-producing within a wider resurgence of homecraft practices, and the extent of householder-initiated adaptations to support food-producing at home. Through these explorations I located contemporary, home-based making practices within sustainable living movements, and speculated as to how making might be fostered spatially and materially. I linked these making practices to the second

theme of adaptation, based on householders' reuse and re-purposing projects undertaken to enhance the fit between their food-producing practices and their homes. These observations reinforced the relevance of questioning dominant housing types more broadly, as social-ecological conditions change and new imperatives and practices arise.

### **Research question 3: How can design research propose alternative, regenerative kitchen-garden systems as an urban resilience strategy?**

The design proposals by participants featured in Chapter 6, in which they sought to enhance the home's ability to support food production, ranged from targeted small-scale interventions, to neighbourhood and community scale strategies. At the detail scale of the dwelling, the addition of sinks, workbenches and utility spaces to aid transition of produce to the kitchen appeared as low cost, high value additions. The neighbourhood and community scale speculations reflected values for social relations that diverge from what is arguably the Australian norm, that is, highly privatised space and individual autonomy as Gaynor (2006) observed. I consider this a significant cultural factor in progressing the study's agenda based on my experience of living in more collectivist Swedish society, where many communal activities are normalised. This insight intersects with the dematerialised design strategies I identified as enabling community scale food networks in Chapter 6. In this light, the practice of design for resilience takes on a pedagogic flavour, with skills in facilitating cooperation, collaboration and community development emerging as core resilience building skills.

The design meta-brief forming the conclusion in Chapter 6 was a culmination of the participatory methods adopted, and a key outcome that guided the regenerative food axis design patterns I proposed in Chapter 7. The meta-brief's inter-scalar considerations build on those in the original food axis (Collins Cromley, 2010), and the design pattern language of Alexander, Ishikawa and Silverstein (1977). The design meta-brief also urged the creation of a zone of in/determination to increase flexibility and facilitate ecological household practices, without dogmatically prescribing them. By focusing my design iterations upon the kitchen-garden interface, I demonstrated its central role in

catalysing targeted practices and the cycling of energy, water and nutrients. Observation of the household adaptations in Phase 2 lent weight to my contention that the design of this interface, and the home more broadly, should not foreclose the option to design-after-design, a key participatory design tenet (Björgvinsson, Ehn & Hillgren, 2012). In this light, designing for flexibility, re-purposing and adaptation become key urban resilience strategies. Critical reflection upon my home, the 'living lab', also infused the evaluation and application of these ideas in its role as a full-scale test bed. My home's role in the study spurred a persistent challenge to generate *transferable* design schemas for contextualisation and adaptation by others.

In addition to the design meta-brief, the regenerative food axis patterns and the design iterations, I proposed two additional roles for social-ecological design research and design practice. Their genesis drew upon resilience thinking and Blewitt's (2006) ecologies of learning, and they point to forms of design practice embedded in grassroots networks and communities of makers. In suggesting the formation of shadow networks (Moberg & Hauge Simonsen, 2011), I argued that typically specialised, professional design practice needs to be broadened with a diversity of skills and know-how in order to design for resilience. The development of a lived ecological literacy located within alternative food and housing movements is key to expanding the social utility of design thinking, research and practice. The second strategy I ventured leverages authentic working models, such as Suburban 5, in engaging people in the re-visioning of their homescape. In Section 8.1, the strategic framework seeks to integrate all of the outcomes above and present a distilled response to the third research question, namely *how* urban resilience can be enhanced through design. I close this section with reflections on the methodology and my aim to contribute to the theory of design research for resilience.

## Reflections on design research for resilience

A further outcome of the study is the three-phase research design elaborated in Chapter 4 that was driven by the three questions above, and Frayling's (1993) early design research distinctions. The overarching methodology merged the research *into*, *for* and *through* design approaches with the social-ecological systems imperative of resilience thinking. The compatibility of this merger,

anticipated in Chapter 1, has been strongly confirmed. The approach advanced in this thesis as ‘design research for resilience’ was contingent upon the interdisciplinarity, distributed knowledge, stakeholder participation, and inter-scalar and temporal awareness core to resilience inquiry. I now view design research, participatory design, and resilience inquiry as operating in an opportune and dynamic interchange that is ripe for progression.

In particular, design research and participatory design offer resilience inquiry additional methods for multi-stakeholder engagement, and ways of exploring and representing future alternatives. Additionally, the know-how I explored in relation to ecologically literate ‘everyday design’ and craft making offers productive insights into how urban resilience strategies might be facilitated via material and immaterial contingencies. In order to progress these demonstrated synergies, there is a need to communicate accounts of how design research for resilience is being practised, transferred and applied. This aspect of the resilience agenda poses an immediate challenge to which I have become keenly committed in my post-thesis life.

## 8.1 A strategic framework for new knowledge transfer

The framework, in the form of practice-focused design strategies, distils the substantive outcomes of Chapters 5, 6 and 7 and serves two functions in this concluding chapter. The first is to re-represent my response to the third research question by proposing in summary form *how* the integration of housing and regenerative food systems can be enacted to enhance urban resilience. The second function reflects my commitment to Kvale’s (1995) validation of new knowledge through communication and action, or dialogue and application. The rationale for the framework in this respect is to aid the transfer of this new design knowledge to ecological design practice and maximise its utility. The design strategies comprising Tables 8.1 and 8.2 therefore address a practitioner audience. The framework is intended as the kernel of multiple, future representations and publications, such as the Environment Design Guide published by the Australian Institute of Architects ([www.environmentdesignguide.com.au](http://www.environmentdesignguide.com.au)), and open resources for design education, as signalled in Section 8.3. Design strategies common to all housing

types and scales comprise Table 8.1, with design strategies for specific housing densities detailed in Table 8.2. Reference to images within the thesis indicates the kinds of illustrations to augment future iterations of the framework, including diagrams of the food axis design patterns in Chapter 7.

<b>Design strategies common to all housing types</b>	
1.	Orientate the dwelling for optimal passive solar performance in tandem with the creation of potential productive space, including on the vertical plane.
2.	In determining potential productive space in site planning, achieve as much year-round sun access as possible and factor in productive use for water and drainage planning.
3.	To catalyse the regenerative systems of the home, treat the kitchen and productive space as a system to guide spatial ordering and relationships.
4.	Multi-use spaces and covered benches can be devised to connect kitchens and productive space and may facilitate other do-it-yourself making and re-purposing projects for householders.
5.	Provide sunny windowsills or shelves, ideally in the kitchen or nearby, for seed raising, sprouting and ripening produce.
6.	Design for systematic waste sorting and cycling of organic and inorganic matter; utility rooms and zones can readily facilitate these practices.
7.	Locate and design kitchens for routine, 'from scratch' cooking by more than one person, constructed from robust, ecologically principled materials that are easily maintained. Proximity to indoor and outdoor social space is practical and valued.
8.	Kitchen storage should include a pantry with shallow shelves and the ability to store bulk, whole foods. Storage provided in the cooler zones of the dwelling can serve as a larder and store less frequently used kitchen equipment such as that used for preserving.

Table 8.1: Design strategies common to all housing types and scales

Design strategies		Specific considerations	
		New or retrofit	Own or rent
1. High-density	<p>1a. Identify potential productive space for individual dwellings (balconies and windowsills) and in common space, for example, yard, roof, path verges, fences.</p> <p>1b. Engineer balconies for container garden weight loads; supply water and drainage.</p> <p>1c. Plan for waste sorting, recycling and composting per dwelling, feeding into larger-scale common facilities.</p> <p>1d. Link kitchen and utility functions with productive space where possible, rather than locating utility function in bathrooms (see Figure 7.6).</p> <p>1e. Re-evaluate typical space allocations for living, sleeping and wet rooms to achieve kitchen facilities supporting cooking from scratch and social cooking.</p> <p>1f. Provide central storage in addition to room-specific storage for potential food preserving equipment and larders.</p>	<ul style="list-style-type: none"> <li>• In retrofit contexts orientation may require separating productive space from kitchen and utility functions. Highly serviceable flooring can help to link the two.</li> <li>• In some settings only common productive space may be possible, requiring co-ordination.</li> <li>• Provide secure lockers and/or benches in productive space for tools and garden inputs.</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipate renters setting up temporary container gardens on balconies and windowsills.</li> <li>• To assist renters in maintaining the condition of the dwelling, specify waterproof windowsills, robust kitchen joinery and highly serviceable flooring.</li> <li>• Assume householders will cook if they have the facilities.</li> </ul>
	<p><i>In addition to 1b – 1f:</i></p> <p>2a. Identify potential productive spaces in anticipation of mixed growing methods, for example, containers, raised beds and vertical trellises.</p> <p>2b. Site dwellings with a priority for morning and midday sun access to productive spaces.</p> <p>2c. Anticipate staged composting, worm farms and small-scale water collection.</p> <p>2d. Plan flexible outdoor eating and social space that can also assist in preparing produce for the kitchen (see Figure 7.8).</p>	<ul style="list-style-type: none"> <li>• In both new and retrofit settings consider the role of common productive space to also foster social activities and community-building.</li> <li>• Design common area landscaping so it does not preclude residents from self-organising to grow food.</li> </ul>	<ul style="list-style-type: none"> <li>• Anticipate renters setting up temporary container gardens on balconies, windowsills and in courtyards.</li> <li>• To assist renters in maintaining the condition of the dwelling, specify waterproof windowsills, robust kitchen joinery and highly serviceable flooring.</li> </ul>



Design strategies		Specific considerations	
		New or retrofit	Own or rent
3. Suburban	<p><i>In addition to 2b and 2d:</i></p> <p>3a. Site dwelling to provide potential productive space likely to include zoned vegetable, fruit and green manure crops, native planting for biodiversity and wildlife habitat, and possibly chickens and bees.</p> <p>3b. Plan for future small structures such as greenhouses, shade structures, animal enclosures and storage sheds.</p> <p>3c. Anticipate larger-scale staged composting, worm farms and grey water recycling.</p> <p>3d. Order kitchen and utility rooms to create a workspace in the transition from productive space to kitchen, in addition to access to outdoor social space (see Figure 7.11).</p> <p>3e. Design storage to allow for differentiated pantry and larder storage, with the latter making use of cooler zones of the dwelling.</p> <p>3f. Consider opportunities to link neighbouring suburban productive space to enable shared cropping and movement of neighbours and animals (subject to consensual agreement).</p>	<ul style="list-style-type: none"> <li>• In new build contexts with small plot areas, evaluate the applicability of the medium-density strategies if potential productive space proves to be limited.</li> <li>• In retrofit contexts existing rear laundries might be upgraded to link outdoor social space with kitchens and utility space.</li> </ul>	<ul style="list-style-type: none"> <li>• Design landscaping that allows householders to set up temporary raised beds and restore the yard if they choose.</li> <li>• To assist renters in maintaining the condition of the dwelling, specify waterproof windowsills, robust kitchen joinery and highly serviceable flooring.</li> </ul>

Design strategies		Specific considerations	
		New or retrofit	Own or rent
4. Peri-urban	<p><i>In addition to 3a – 3f:</i></p> <p>4a. In master-planned projects include potential productive space in requisite park and play space allocations to allow large area, communal crop cultivation, for example, orchards, tubers and root crops (see Figure 7.12).</p> <p>4b. Design common landscaping with a priority for native planting and habitat, and species beneficial to pollinators.</p>	<ul style="list-style-type: none"> <li>In retrofit contexts, advocate and facilitate linkages with inner urban food production so that some peri-urban households become net suppliers of compost, mulches and materials to private, community and school kitchen gardens.</li> </ul>	

Table 8.2: Design strategies for specific housing densities

With a goal of maximising opportunities for transfer and re-contextualisation of the framework, the matrix format of Table 8.2 seeks to intersect scale, expressed as housing density, with specific design considerations. These include the issues of tenure, and new-build or retrofit adaptation highlighted throughout the thesis. This enables the framework to be used to leverage existing, authentic ecological housing models, and equally inform the design of emergent productive housing, as foreshadowed in Chapters 1 and 2. In the penultimate section of the chapter to follow, I broaden focus to the limits of the study's scope and context, and the mitigating strategies adopted.

## 8.2 Limitations of the study

The foremost constraint of the study was the location of the 12 households in Tasmania, and as a result, my limited access to high-density housing. Conversely, Tasmania's atypical attributes such as small population, low urban densities, and low relative socio-economic status were opportune for suggesting how people might leverage their housing resources in conditions of necessity. I mitigated these atypical attributes by drawing on secondary and experiential accounts, particularly in relation to high-density, multi-dwelling

housing. My conference attendance and travel during the study, including visits to New York, London, Melbourne and Sydney, enabled greater contextualisation of the secondary accounts I drew upon.

A further issue is that by targeting home- and community-based food production, I have privileged plant-based foods. In claiming to have designed for regenerative food systems, it would be reasonable to question where our other sources of food, such as dairy, meat and broad-acre crops, are to be sustainably sourced. I reiterate here that localised food systems are interdependent with regional systems producing such foods. As I argued in Chapter 5, our routine food choices are implicated in, and challenged by, the conditions of widening ecological overshoot in which we live. On both ecological and health grounds, I contend that privileging plant-based foods is defensible. From a resilience perspective, social trends towards increasing casualisation of labour, under-employment, and under-resourced ageing populations may all conflate in a necessity to produce more food at home, helping to redefine tastes for plant-based foods. It may also help to garner greater value for peri-urban and regional smallholdings, functioning as revived ‘biocultural refugia’ (Barthel, Crumley & Svedin, 2013), that help to maintain diversity in the food supply. In the following section, I direct my speculation about the future to suggesting opportunities for inquiry emanating from this study.

### 8.3 Opportunities for future inquiry

In this closing section, I venture three suggestions for future inquiry in ascending order of ambition. The suggestions centre upon resilience thinking in design education, design anthropology, and the concept of ecological agency. The first suggestion is predicated on a need to move design education (in many quarters) beyond its subservience to outmoded concepts of sustainability. In support, the tangible outcomes of this study could be incorporated into design curriculum to help foster acceptance of social-ecological systems thinking and design for resilience. The design meta-brief, regenerative food axis design patterns and strategic framework lend themselves as open-access resources for student-led design projects, such as those documented by Komisar, Nasr and Gorgolewski (2009). Further, the current shift toward open educational

practices and transformative pedagogy (Smyth, Bossu & Stagg, in press) positions students as creators of real world, knowledge artefacts emerging from design for resilience projects. The inquiry opportunity is twofold: design students become co-inquirers in open resilience scholarship, and their learning processes the subject of scholarly inquiry for design educators.

The second suggestion builds upon the first and pertains to the emergent field of design anthropology (for example, Gunn, Otto & Smith, 2013). Design practice, anthropological methods and participatory design are merged in this new field to create positive interventions in particular social contexts. This aim resonates with Ingold's (2013) practice of anthropology as *transformational* rather than documentary. Related approaches have emerged in design education, such as the Swedish student design projects outlined by Sara Hyltén-Cavallius (2012) which foreground the utility of design thinking in authentic and complex social contexts. A hypothetical study might involve a high-density housing development whose residents are invited to embark on a resilience building program with student designers, incorporating food production and enhanced regenerative capacity. Such approaches could prove conducive for the many design schools co-located with high-density housing in inner urban locations. This circumstance could foster immediate interchange between the site of inquiry and a given design school's research activities.

The third and final suggestion is more audacious in attempting to subvert and redirect industry-based research and development. If the goal of inquiry is to advance and apply the concept of ecological agency, as a social-ecological extension of material agency, to the production of green goods, then who better to target than a global giant in the perpetual design, production and renewal of homewares: IKEA. Approached via appropriate networks, I suggest that IKEA might prove to be a receptive entity for applying ecological agency in design, based on the commitment to sustainability the corporation evinces and its extensive design development operations. Ideally, this proposal would leverage existing cradle-to-cradle work with industry, and arise out of a collaborative research alliance contingent upon robust scoping work by researchers involved in design-led innovation. Like McDonough and Braungart (2013), I recognise

that engaging the corporate sphere is as crucial as engaging the grassroots, with designers actively bridging the dividing middle ground.

These suggestions are but three strategies for transforming the *status quo* through constructive means; however, they are not solutions to our ecological crisis and uncertain future living conditions. The urgent challenge is to build resilience, one thread of which is the integration of housing and regenerative food systems in expanding urban settings. This challenge demands unprecedented multi-skilled and multi-scalar engagement and exertions from us all, enacted everyday, and beginning at home.



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# Image sources

## Chapter 2

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p. 63, Figure 2.2: Rear view of the Integral Urban House showing greenhouse, solar collectors and productive garden. Retrieved August 29, 2014, from <http://www.motherearthnews.com/~media/Images/MEN/Editorial/Articles/Magazine%20Articles/1980/01-01/The%20Integral%20Urban%20House/061%20Integral%20Urban%20House.jpg>

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## Chapter 5

p. 139, Figure 5.2: Nigella Lawson teaching the ‘art of lifestyle’ in her television kitchen. Retrieved March 26, 2014, from <http://static2.stuff.co.nz/1361836610/091/8353091.jpg>

p. 155, Figure 5.6: IKEA kitchen with adjacent waste sorting storage and suggestion of small-scale gardening practices. Retrieved March 16, 2012, from [http://www.ikea.com/au/en/catalog/categories/departments/secondary\\_storage/#!/20121\\_hors06a\\_01](http://www.ikea.com/au/en/catalog/categories/departments/secondary_storage/#!/20121_hors06a_01)

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# Appendices

Appendix A: Phase 2 multi-household ethnography prompt form

Appendix B: Phase 2 summary for participants

Appendix C: 'Living lab' images

# Appendix A

Phase 2 multi-household ethnography prompt form

**Address:**

**WATER**

**ENERGY & NUTRIENT CYCLING**

**GROWING METHODS**

**HARVESTING / KITCHEN**

**PRESERVING**

**STORING**

**OTHER E.G. HOUSE / SUN ACCESS / IMPROVISATIONS**

## Appendix B

Phase 2 summary for participants (reformatted from original landscape layout)

# Design at the service of sustainable, local food systems

## House-garden visits Feb-Apr 2013: Summary for participants

A study by Wendy Fountain, School of Architecture & Design, UTAS

### Introduction

During February to April this year your generosity, interest and support made it possible for me to visit and explore twelve different food growing-kitchen settings, the majority of which meant opening up your homes to me. I begin this summary therefore with sincere thanks for your time and commitment to the study!

Along with insights from the various settings, my aim in this summary is to share key ideas and strategies that might further guide your successes in producing food at home.

The settings comprised three rural properties, five suburban, two medium-density, one high-density, one cooking school, plus one inner city community garden adjoining high-density housing for comparative purposes. With the exception of the latter, all are located in Tasmania.



The insights, guidance and related images are organised around four main headings:

- The big picture: food, resources, energy, water and waste
- Growing and producing methods
- Food to the kitchen: harvesting and provisioning
- Preserving food and storage.

I conclude the summary with some brief reflections and outline the next steps for the project.

## 1. The big picture: food, resources, energy, water and waste

Across the settings, growing food emerged as a theme connected with living with a lower ecological footprint. Many participants in the study had adopted complementary strategies, for example, recycling and re-using existing resources, increasing energy efficiency, installing solar, conserving water and minimising waste. Growing and producing is also an important way that values and concerns about food and in some cases, consumption, are being enacted.

Many participants expressed they grow food too for reasons of health, well-being, enjoyment and satisfaction. The motivations for growing at home vary; the goal of some is to supplement other food sources (often local, seasonal and organic), while others are pursuing self-sufficiency. In a few cases, home-based production extends to brewing beverages, and making cleaning products, soaps and salves.



In several cases, the home and garden had been adapted – ‘blitzed’ in one or two cases – for home-based food production, or was in a process of transformation, often cleverly re-purposing second hand materials. Participants who are renting had devised some imaginative temporary adaptations. In one townhouse setting for example, common area landscape beds planted with ornamentals were being tended to grow potatoes and squash among the ‘low maintenance’ plants. And neighbours are bestowed with gifts of produce.

In all settings, resourcefulness and thrift abounded, as well as an appreciation of the garden as a place with important social functions and spiritual significance. Mentors and support networks are immensely valued too including ‘wise’ individuals, online resources such as blogs, ‘how to’ videos and social networking sites. Several participants were relatively new to growing food so much trial and error is involved; documented by some to record successful plant varieties, sowing times, yields and the methods used.





## 2. Growing and producing methods

While participants are committed to growing with organic methods as far as possible, two main approaches are evident, linked to garden scale and whether animals play a role. Those with good sources of manure and the 'services' provided by rotating chickens and pigs, for example, are able to adopt more of a systems approach in their gardens, akin to the principles of permaculture.



Common to nearly all settings is the inability to generate sufficient compost to maintain soil fertility (with differing schools of thought on how this should best be achieved!). The second approach therefore relies on a larger range of external garden inputs, such as bagged potting mix and seaweed concentrate, which in small gardens is perhaps the most practical way of growing. The broader uptake of home and community growing is pushing demand for these essential inputs however, posing questions I pick up in the final section.

There is much awareness of zoning different crops, with salad leaves and herbs close to the kitchen for easy picking, and also of companion planting for pollination and pest mitigation. Vertical growing spaces such as fences and trellises are being well-utilised, along with sunny brick walls serving as heat sinks for chillies and peppers. Crop rotation is proving more difficult in practice than in theory, with variable sun access, drainage and plant-soil compatibility often determining what grows best where. Again, trial and error features strongly.



Two related websites of interest:

**Compost** (there may be similar services in other municipalities)

[http://www.hobartcity.com.au/Environment/Recycling\\_and\\_Waste/Composting\\_and\\_Worm\\_Farms](http://www.hobartcity.com.au/Environment/Recycling_and_Waste/Composting_and_Worm_Farms)

**'Life in the soil: paper and cardboard in compost?'**

<http://rodaleinstitute.org/2013/life-in-the-soil-paper-and-carboard-in-compost/>

### 3. Food to the kitchen: harvesting and provisioning

It is clear that planning for the journey of food from the garden to kitchen was not on the agenda if gardens were originally conceived of as lawns, ornamental planting, entertaining areas, play space, and dog runs. In several settings, the kitchen and other spaces such as laundries and storage had been adapted specifically to support home-produced food.

Kitchens are viewed favourably when they offer generous bench space for 'processing', a sunny windowsill (for germinating seeds and ripening), and plenty of storage cupboards for the 'infrastructure' of home-produced food and related equipment. At harvest time, ripening and preserving space is at a premium, with the need to borrow surfaces and furniture normally used for other purposes. Existing kitchens, as observed, are not well-equipped for a systems approach to sorting and storing organic waste for cycling back to the garden.



Given the inability to generate sufficient compost, any kitchen 'waste' that could be diverted to this use is highly prized, with one example noted of a benchtop sorting system for chickens, worms and general compost. The instructive book, *The Integral Urban House* by Helga Olkowski et. al, promotes an easy-to-use, attractive, internal 'waste management centre' to encourage all members of the household to sort and recycle waste. At a cooking school visit dedicated to preserving tomatoes in diverse forms, the backyard was set up as a temporary processing space with large-scale equipment for pulping, bottling, sealing and heat-sterilising. This evoked images of the harvest time preserving festivities of various cultures. And depending on the crops, setting up temporary harvest infrastructure in the home might suffice for some. Others, however, are aiming for year-round produce.



#### Reviving the 'dirty kitchen' or mud room

The need for some form of 'dirty' transition kitchen for pre-cleaning produce was identified in several cases with sinks or tubs and benches being added near to the kitchen entrance or close to the garden beds or pots. This can also offer the ideal space for cycling kitchen waste. In my own case, a small, single wall kitchen continues outside, providing a similarly sized covered patio kitchen with a second sink, and under-bench waste sorting, connecting to a small combination larder and garden shed. (This in turn minimised the proportion of the house that needed to be double-glazed and heated.) Discouraging vermin in the outdoor food spaces has become an important consideration.



## 4. Preserving and storing home produce

Eating seasonally is a key objective for some participants, so that preserving food for later use is not a priority. Most are involved in some form of preserving however, with many combining their own produce with other sources of bulk, ripe produce at harvest time. Bottling, dehydrating, freezing and dry-storing (e.g. potatoes, onions, garlic) are common methods, with an awareness that a mix of methods is prudent should a major blackout ruin freezer stocks. Freezers are of course also more energy intensive.

A great variety of preserved foods reflects a diversity of tastes and food preferences. Some approaches favour building up a good stock of winter staples, such as passata, while others are more interested in growing produce and capturing flavours for particular cuisines, making for example, pestos, curry pastes and specific sauces. Typically, the availability (or gluts!) of particular crops drives what ends up preserved in any given year, and by what method.



For those also committed to buying bulk wholefoods such as flour, grains and pulses, the demands on pantry storage are quite different to joinery built for standard 'polite' packaged foods. Bulk foods require large easy-access, sealed bins or bags, robust shelving or under-bench space, with a 'stock control' method for storing top-ups until the current batch in a bin or bag is fully used.



The sunless, uncomfortably cold spaces of some houses have become more useful as they are ideal for larders and storing the considerable amount of equipment required for preserving such as one or more Fowlers urns, jars and lids of different sizes, perhaps a dehydrator and the eventual filled jars. In one case a guest bedroom wardrobe had its shelves reinforced and was completely stocked for the winter ahead. In another case, the ideal location for a larder saw the front door and entrance hall sealed over and insulated for even temperature, now accessible from the inside only. The entrance has moved to the side of the house in a lovely example of food-driven prioritisation!

## 5. Reflections and next steps

I was particularly curious about how tenure – owning or renting – might impact growing and producing food at home. Renting certainly does not preclude growing food but it does place greater constraints on methods, crop types, and the ability to make adaptations for better sun access and food-related storage. Healthy landlord and neighbour relationships make a difference.



I was also very interested in the impact of scale – higher densities compared with larger suburban and rural settings. An early conclusion is that larger scales make nutrient and energy cycling considerably easier. The reason for this is that at a larger scale, growing food can more readily encompass the cultivation of crops grown specifically for soil fertility and microbial health e.g. green manures, compost teas and tonics, mulches, and fodder crops for animals supplying manure. It takes time and planning too, to establish these interdependent methods.

Jerry Coleby-Williams recently promoted 'food for the garden' in his suburban Brisbane context: <http://www.abc.net.au/gardening/stories/s3750224.htm>

This is now a priority in my small garden; scaling back commercial inputs and looking to local 'waste' sources. My concern for where food comes from has led me 'into the soil' to scrutinise where soil fertility comes from, and the potential negative ecological impacts of some inputs.



Evident in some settings are strategies for 'future-proofing' the garden in response to ageing and disability. This is an area for further focus, particularly with our ageing population, and the positive role food growing is fulfilling in community service environments. The adaptations made by participants to their homes and gardens foreshadow the kinds of ideas likely to emerge from the next phase of the study, a series of design-for-local-food workshops. Here we can speculate how domestic food spaces might better support home-based food production.

I remain confident that the usability and flexibility of the home, and its ecological potential, can benefit from this kind of research. Design practice, design education and housing policy are all ripe targets for the study's outcomes.



## Appendix C: 'Living lab' images



Image 1: The rotation beds, with mixed edible and companion plantings, are proximal to the outdoor kitchen, social space and store.



Image 2: The kitchen-garden interface links the indoor and outdoor kitchen joinery. Under-bench bins are used to store garden inputs.



Image 3: During the potato harvest the covered social space is appropriated for drying and sorting.



Image 4: The outdoor kitchen bench is used for a variety of harvest-related tasks, with 'waste' easily transferred to the compost.

